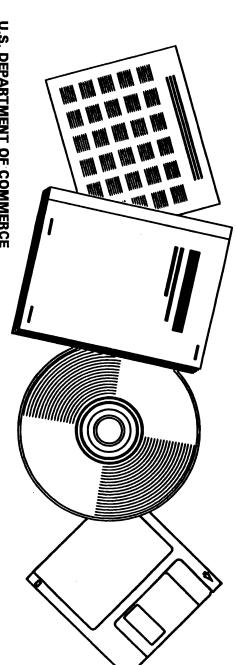
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DETERMINING the DEGREE of AGGREGATE

DEGRADATION After Using the NCAT ASPHALT

CONTENT TESTER.

# Randolph Reyes

Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222

Final Report August 1997

Prepared in cooperation with the U.S. Department of Transportation Federal Highway Administration

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The purpose of the research conducted was to determine if aggregate degradation takes place and to measure the possible degree of degradation after bituminous mixtures are heated inside the NCAT Asphalt Content Tester. A study was conducted which compared the original aggregate blend (Control specimens) to the residual aggregate blend (Experimental specimens) obtained after several bituminous mixtures were heated inside the NCAT Asphalt Content Tester. The Control specimens and the Experimental specimens used to produce the bituminous mixtures were the result of an aggregate sample which was split three times. Two methods of analysis were used to review the gradation results. It was determined after reviewing both methods of analysis, that the gradations of the bituminous mixtures used in the study were not statistically different after being heated inside the NCAT Asphalt Content Tester. The aggregate gradation correction factors that were required in this study were relatively low (less than one percent) and were needed only in a few instances. However, this might not be true in all instances.

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The contents of this report reflect the views of the author who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views of the Colorado Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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### **ANALYSIS METHOD ONE**

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- 1. Mean Difference Figures for Aggregate Sources
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- 1. Confidence Interval Figures for Each Aggregate Source
- 2. Data Used To Calculate the 95% Confidence Interval Figures
- 3. Data From the Students t-Test
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#### **APPENDIX C:**

- 1. Frequency Figures for Each Sieve Size
- 2. Data Used to Calculate Frequency Figures

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APPENDIX D: DATA

**APPENDIX E: CPL-5120** 

## 1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) is phasing out chlorinated solvents used in the United States. These solvents have been used in the past to remove the asphalt cement (AC) from bituminous mixtures allowing aggregate gradations to be performed. The NCAT Asphalt Content Tester (an ignition oven) has been introduced as an alternative to the solvent extraction method. It works by removing (physically burning away) the AC from the bituminous mixture.

Several companies manufacture ignition ovens, including
Barnstead/Thermolyne, Troxler, and Gilson Corporation. The
Barnstead/Thermolyne equipment is known as the National Center for Asphalt
Technology (NCAT) Asphalt Content Tester and was used to generate the data
in this paper. The ignition oven and the NCAT Asphalt Content Tester refer to
the same equipment in this document.

### 1.1 Background

In June of 1995, the Colorado Department of Transportation purchased and received six NCAT Asphalt Content Testers manufactured by Barnstead/Thermolyne Corporation. The Central Laboratory located in

Denver, Colorado retained two of the ovens and distributed the remaining four ovens to different Regions throughout Colorado. One oven in the Central Laboratory was set up (electrically wired and vented) for use. The NCAT Asphalt Content Tester was then evaluated concerning its effect on aggregate gradations from different bituminous mixtures.

2.0	<b>PURPOSE</b>			
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The purpose of this experiment was to determine if aggregate degradation occurs in a bituminous mixture when heated inside the NCAT Asphalt Content Tester. In addition, if aggregate degradation does occur, to quantify the extent of the degradation.

### 3.0 APPARATUS

- 3.1 NCAT Asphalt Content Tester.-The NCAT Asphalt Content Tester is a forced-air ignition furnace, with internal balance, capable of maintaining a temperature of 538° C (1000° F). The NCAT Asphalt Content Tester consists of an electronic housing unit, an oven chamber and an exhaust chamber. The electronic housing unit is located underneath the oven chamber and is separated by an air space. This area of the unit houses the electronic controls as well as the internal scale used to monitor weight loss. The oven chamber is located in the middle of the unit. The oven chamber is heated electrically using ceramic heating elements. A hearth tray located inside the oven chamber is supported by ceramic tubes which extend down to the internal scale. The accuracy of the internal scale balance is verified by placing calibrated weights on the hearth tray at room temperature. The exhaust chamber is located above the oven chamber. An exhaust fan and filters are used to control the smoke and fumes while testing.
- 3.2 Basket Assemblies--Two stainless steel 2.36mm (No. 8) mesh perforated basket assemblies were nested on top of each other with a drip pan located on the bottom of the assembly. This configuration allowed the bituminous mixture increased surface area exposure and facilitated more complete burning of the AC.

- 3.3 Asphalt Mixer and Mixer Bowl--A HOBART mechanical mixer (Model N50) with an approximate capacity of 5 liters and capable of mixing approximately 1250 grams of aggregate.
- 3.4 External Scale--An AND 20 kg capacity scale accurate to 0.1 gram was used in this experiment.
- 3.5 No. 200 Wash Sieve Screen--A 304.8 mm (12 inch) diameter 0.075 mm (No. 200) sieve was used to wash the minus 0.075mm (No. 200) material from the Experimental and Control specimens before performing the subsequent gradation analysis on the remaining aggregate.
- 3.6 Set of Nine 203.2 mm (8 inch) Diameter Sieves--A set of sieves having a 203.2 mm (8 inch) diameter, with sieve openings conforming to ASTM E-11. The sieve sizes used were: 12.5 mm, (1/2 inch); 9.5 mm, (3/8 inch); 4.75 mm, (No.4); 2.3 mm, (No.8); 1.18 mm, (No.16); 0.625 mm, (No.30); 0.3 mm, (No.50); 0.15 mm, (No.100): and 0.075 mm, (No.200). A ROTAP mechanical sieve shaker (Model RX-29) was used to separate the aggregate into different particle sizes.
- 3.7 Set of Three 304.8mm (12 inch) Diameter Sieves--A set of three 304.8 mm (12 inch) diameter sieves with screen sizes of + 9.5 mm (+ 3/8 inch), + 4.75 mm

(+ No. 4) and - 4.75 mm (- No. 4) were used to separate the aggregate into three different particle sizes prior to using the riffle sample splitter.

3.8 Riffle Sample Splitter--A sample splitter with 12, 37.5 mm (1 1/2 inch) equal width chutes was used to split the aggregate. Four chute catch pans were used.

3.9 Miscellaneous Equipment--A pan having dimensions of approximately (L  $\times$  W  $\times$  H) 38  $\times$  38  $\times$  5 cm was used for containing the residual aggregate after ignition. A steel wire brush was used to remove residual aggregate from the steel basket assembly after AC burn off.

# 4.0 PROCEDURE

# **4.1 Sources of Aggregate**

Six aggregate sources were selected from various geographical areas which represented some of the varying aggregate types found within Colorado.

Table 1. Aggregate Source, Absorption, Mineralogy, Specific Gravity and Location

AGGREGATE	CRSE/FINE	MINERALOGY	CRSE/FINE	LOCATION
SOURCE	AGGR.		AGGR.	
	WATER		SPG	
	% ABSORB		(AASHTO)	
	(AASHTO)			
Franciscotti	0.9, N/A	Sandstone	2.66, 2.59	Walsen-
		Shale		burg
Raiston	0.72, 1.03	Quartz	2.77, 2.75	Denver
		Diorite		
Valco/Rocky	0.9, 0.8	Decomposed	2.62, 2.61	Colo.
Mtn./Cas		Granite		Springs
Irwin Windsor-	0.8, 0.4	Feldspar	2.61, 2.66	Fort
Stute				Collins
Monk	0.8, N/A	Granite	2.64, N/A	Limon
Pagosa Trout	2.1, 1.7	N/A	2.54, 2.51	Pagosa
Lakes				Springs

### 4.2 Aggregate Set Up

Six different (10000 gram) aggregate sources of grading CX, 12.5 mm (1/2 inch) nominal maximum, were set up together using six different aggregate blend formulas.

## 4.3 Separating and Splitting Aggregate

In a attempt to reduce segregation, the 10K gram samples were separated into three different sieve sizes, + 9.5 mm (+ 3\8), + 4.75 mm (+ No.4) and - 2.36 mm (- No.4) using three 304.8 mm (12 inch) diameter sieves. The three different sizes of aggregate were split individually three times using a riffle sample splitter. The aggregate from each of the three sieve sizes were combined which resulted in eight specimens of approximately 1250 grams each. This method was used to increase the probability for an even split when the larger aggregate sizes were dropped through the riffle sample splitter. To further reduce the margin of error between specimens, the four Control and four Experimental specimens were collected from alternate sides of the sample splitter.

## 4.4 Combining with Hydrated Lime and Water

All eight (approximately 1250 gram) aggregate specimens from each of the six aggregate sources were mixed with one percent hydrated lime and approximately four percent water, oven dried inside a 121°± 5 C (250° F) oven for 6 ± 1 hours and then cooled to room temperature. Removing the moisture was important since aggregates that have high absorption values may retain moisture which may cause the aggregate to "pop" (break apart changing the gradation) inside the NCAT Asphalt Content Tester.

## 4.5 Treatment of Control Specimens

The Control specimens were stored on a shelf at room ambient temperature and humidity until gradations could be performed as described in Section 4.7

### 4.6 Rational for Mixing the Experimental Specimens with AC

Mixing the aggregate specimens with asphalt cement was thought to be an important factor since these specimens would be exposed to higher temperatures (greater than 538° C (1000° F)) inside the ignition oven (compared to aggregate only specimens) as the asphalt cement burns.

Aggregate mixed with asphalt typically burns in the oven at 600° C (1112° F) to 700° C (1292° F). These higher temperatures may increase the probability that the aggregate degrades. In addition, the aggregate which will be

evaluated for gradation during the life of construction projects will also be mixed with asphalt cement when determining asphalt cement content.

## 4.6.1 Treatment of Experimental Specimens

The four Experimental specimens were re-heated again inside a 148 +/-  $5^{\circ}$  C (300° F) oven for 3  $\pm$  1 hours and mixed with approximately five percent AC, (Conoco AC-10).

The bituminous mixture specimens were placed inside the NCAT Asphalt Content Tester (at a set point temperature of 538° C (1000° F)) immediately after the mixing process and tested per CPL-5120, see Appendix E. The AC in the bituminous mixture was ignited and burned away leaving the residual aggregate. The residual aggregate was cooled for approximately one-half hour inside the basket assembly and then collected in a steel pan. The Experimental specimens were stored on a shelf (less than 24 hours) until gradations could be performed per Section 4.7

#### 4.7 Gradations

Gradations following AASHTO T 27 (Sieve Analysis of Fine and Coarse

Aggregates) and T 11 (Amount of Material Finer Than 0.075 mm Sieve in

Aggregate) were performed on each of the eight specimens from each of the

six aggregate sources. A ROTAP mechanical sieve shaker was used as described in Section 3.1, to separate the aggregate into different size fractions.

Table 2. Number of Gradations Performed per Sieve Size

Sieve Size	No. of Control Specimens Per Aggregate Source	No. of Exp. Specimens Per Aggregate Source	No. of Aggregate Sources	Total No. of Grad. Per Sieve Size
Each of the nine sieve sizes	4	4	6	48

## 4.8 Methods of Analysis

There were two methods used to analyze the gradation results after using the ignition oven.

4.8.1 First Method of Analysis (Comparison of the Mean of the Experimental and Control Specimens)

The first method of analysis compared the mean of the gradations between the four Experimental and four Control specimens. The "mean difference" for the percent passing each sieve size for each aggregate source was calculated by subtracting the average (mean of the four Control specimens) of the original design gradation from the average (mean of the four Experimental specimens) of the residual aggregate specimens after using the NCAT Asphalt Content Tester.

In addition, Confidence Interval and Frequency graphs were generated. The Student's t-Test for a paired two sample comparison was also used to determine if the gradation results from the Control and Experimental specimens were statistically from the same population set. A 95 % confidence level was used. The t-test data was also used to generate the Confidence Interval figures (1).

4.8.2 Second Method of Analysis (One-to-One Comparison between Experimental and Control Specimens)

The second method compared the gradation results between the Experimental and Control specimens on a one-to-one basis. All possible combinations of the Experimental and Control specimens were paired per sieve size and their percent differences were calculated. The sample standard deviations were

calculated for each of the nine sieve sizes. The standard deviations calculated from each of the sieve sizes were compared to the single standard deviations found in the precision statement of AASHTO T 27.

# **5.0 GRADATION RESULTS AND DISCUSSION**

# 5.1 Analysis Method One (Aggregate Gradation Results)

In Sections 5.1.1 - 5.1.6 and 6.1.1 - 6.1.4 the "mean difference" refers to the average of the percent passing the four **Experimental** specimens minus the average of the percent passing the four **Control** specimens calculated for each of the sieve sizes.

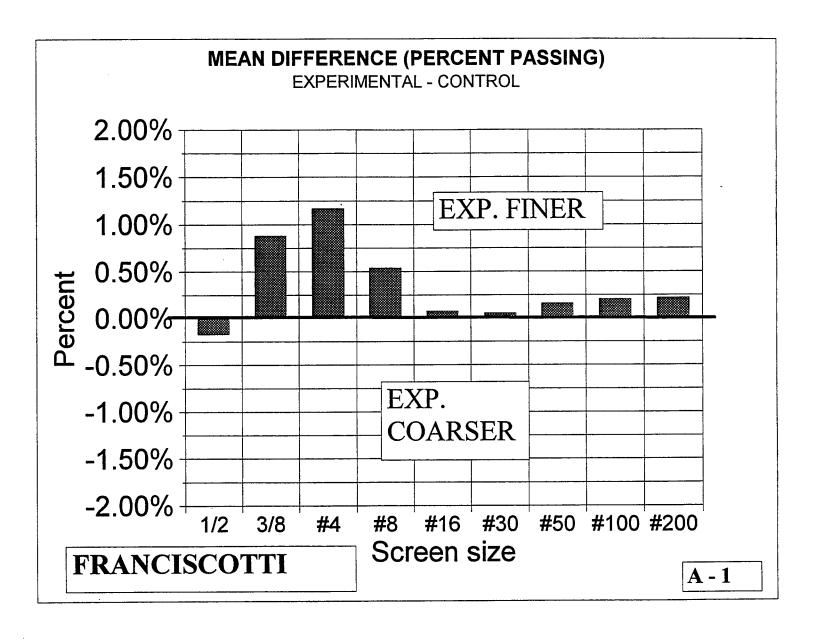
5.1.1 Mean Differences Between the Control and Experimental Specimens

Illustrated for the Franciscotti Aggregate Source

Figure 1. represents the mean differences calculated for each sieve size for the Franciscotti aggregate source. The analysis, data and figures for all of the aggregate sources can be found in Appendix A.

Figure 1. Mean Differences Illustrated For Each of the Nine Sieve Sizes

Representing The Franciscotti Aggregate Source



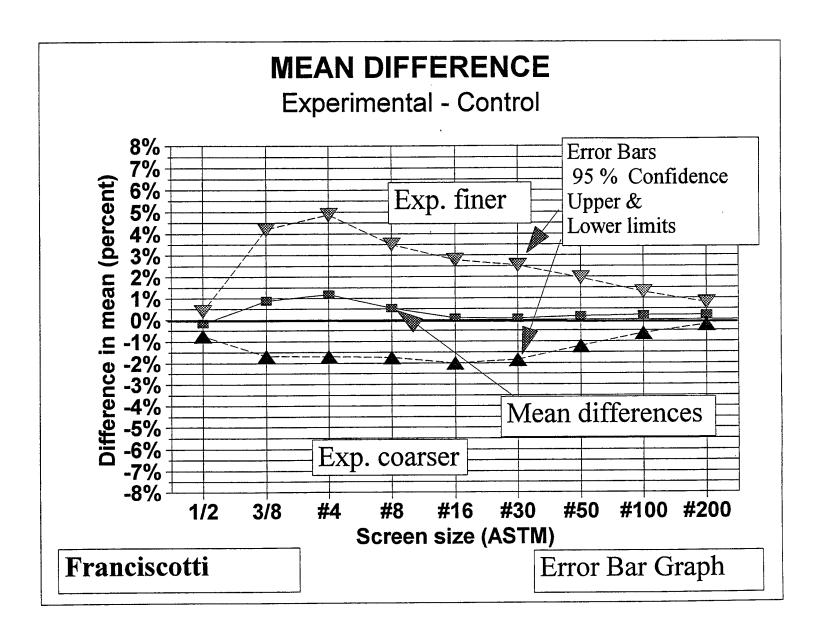
After the mean differences for the percent passing each sieve size were calculated for the six aggregate sources, 45 out of the 54 sieves had more material passing each sieve, (the Experimental specimens were finer than the Control specimens).

The mean differences for the percent passing each sieve size were greater than 1.0 percent, but less than 1.75 percent for only three out of the 54 sieves tests (nine sieve sizes times six aggregate sources). The 9.5 mm (3/8 inch) sieve sizes from the Monk and Ralston aggregate source, and the 4.5 mm (No.4) sieve size from the Franciscotti aggregate source were the only sieves in which there were mean differences that were greater than 1.0 percent. The remaining 51 sieve test mean differences were all less than 1.0 percent.

5.1.2 Confidence Interval Figure Displaying the Upper and Lower Limits for the Franciscotti Aggregate Source

Figure 2. is a graphical representation illustrating the upper and lower confidence intervals for the Franciscotti aggregate source. The remaining illustrations representing the other aggregate sources may be found in Appendix B. The data used to calculate the confidence interval limits were generated by applying the Student's t-test for paired samples. The data used to generate the figures may also be found in Appendix B.

Figure 2. Confidence Intervals Representing the Upper and Lower Limits For The Franciscotti Aggregate Source

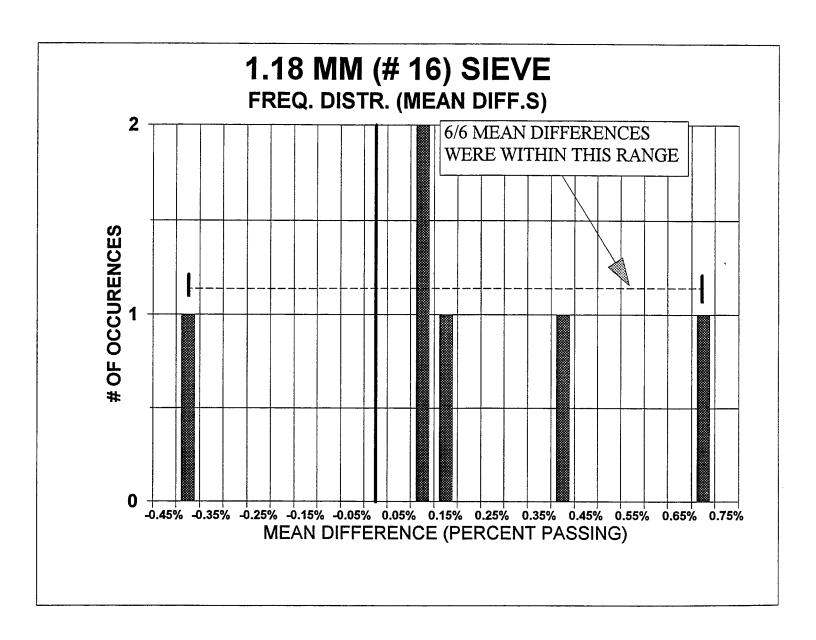


5.1.3 Frequency Distribution Illustrating the Mean Differences for the 9.5 mm (3/8) Sieve Size

Figure 3 represents the range between the mean differences for each of the six aggregate sources for the 9.5 mm (3/8) sieve size. The remainder of the figures representing the other sieve sizes used in this study may be found in Appendix C. The figures demonstrate that the range between the lowest and highest mean differences were normally less than 1.0 percent. Occurrences which deviated further away from the concentrated group of the mean differences may have been due to the splitting or mechanical mixing process, or the aggregate may have degraded during ignition process.

Figure 3. Frequency Distribution Displaying The Mean Differences

Representing The 1.18 mm (# 16) Sieve



# 5.1.4 Frequency Distribution for the 54 Sieve Tests

Figure 4 represents the frequency distribution of the mean differences for the 54 sieve tests. The mean calculated for the "mean differences" as defined in Section 4.8 for all of the 54 sieve tests was 0.32 percent.

Figure 4. Frequency Distribution Of The Mean Differences For 54 Sieve Tests

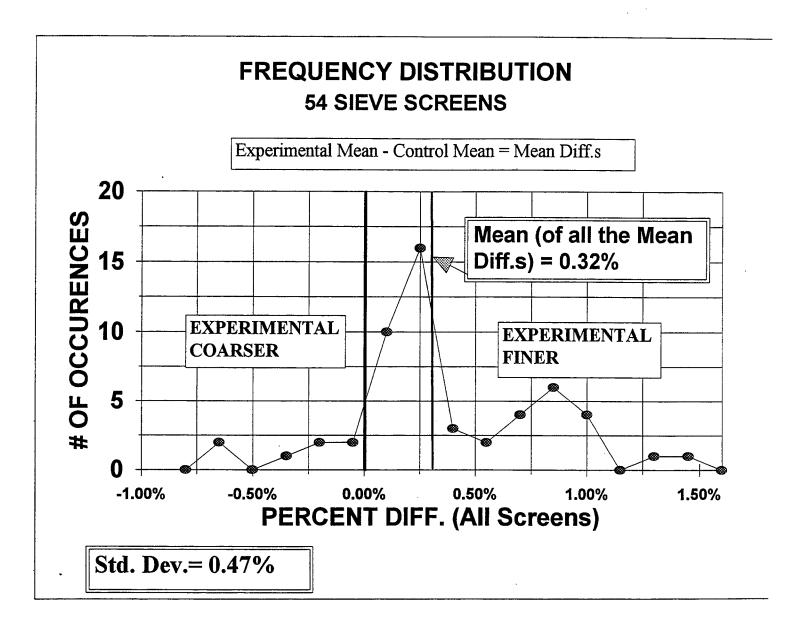


Table 3. Data used to generate Figure 4.

# **NCAT OVEN GRADATION STUDY**

MEAN

0.32%

FREQUENCY			COME	
12-19-95	DATA	CODEEN	SCALE	THE OCCUPED
SCREEN	VALUES	SCREEN	X-AXIS	TIMES OCCURED
SIZE	mean diff.	metric	PERCENT, RANGE	frequency
1/2	-0.17%	12.5	-0.80%	0
1/2	-0.78%	12.5	-0.65%	2
1/2	-0.03%	12.5	-0.50%	0
1/2	0.03%	12.5	-0.35%	1
1/2	0.08%	12.5	-0.20%	2
1/2	0.24%	12.5	-0.05%	2
3/8	0.88%	9.5	0.10%	10
3/8	1.44%	9.5	0.25%	16
3/8	-0.30%	9.5	0.40%	3
3/8	0.53%	9.5	0.55%	2
3/8	1.68%	9.5	0.70%	4
3/8	0.11%	9.5	0.85%	6
#4	1.17%	4.75	1.00%	4
#4	0.81%	4.75	1.15%	0
#4	0.80%	4.75	1.30%	1
#4	0.07%	4.75	1.45%	1
#4	0.10%	4.75	1.60%	0
#4	0.23%	4.75		
#8	0.54%	23		
#8	0.19%	2.3		
#8	0.80%	2.3		
#8	0.38%	23		
#8	-0.77%	23		
#8	0.86%	2.3		
#16	0.07%	1.18		
#16	0.15%	1.18		•
#16	0.05%	1.18		
#16	0.36%	1.18		
#16	-0.41%	1.18		
#16	0.67%	1.18		
#30	0.05%	0.625		
#30	0.18%	0.625		
#30	-0.21%	0.625		
#30	0.71%	0.625		
#30	-0.10%	0.625		
<b>#</b> 30	0.64% 0.16%	0.625		
#50 #50	0.10%	0.3 0.3		
#50	0.22%	0.3		
#50 #50	0.13%	0.3		
#50	-0.00%	0.3		
#50	0.65%	0.3		
#100	0.20%	0.15	•	
#100	0.16%	0.15		
#100	0.16%	0.15		
#100	0.87%	0.15		
#100	0.13%	0.15		
#100	0.58%	0.15		
#200	0.22%	0.075		
#200	0.12%	0.075		
#200	0.04%	0.075		
#200	0.76%	0.075		
#200	0.81%	0.075		,
#20.0	0.39%	0.075		
STDS	0.47%			

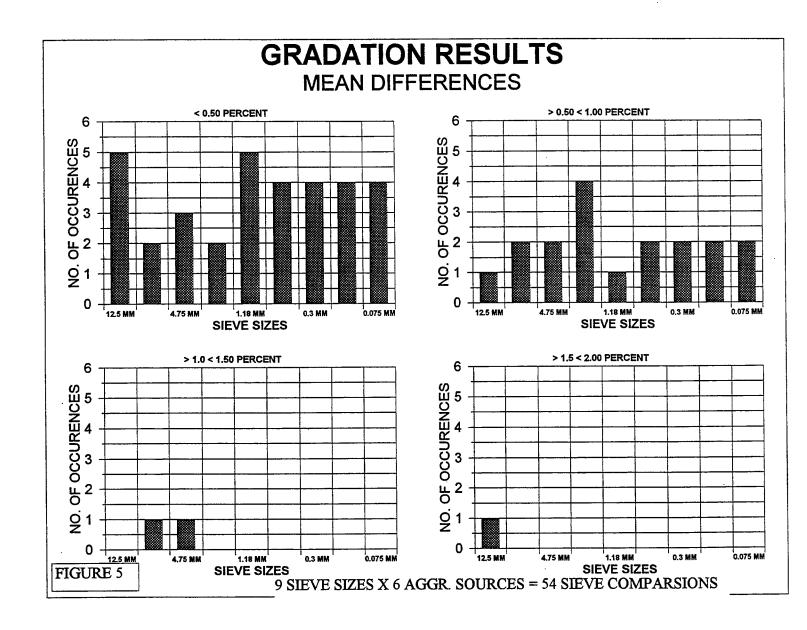
5.1.5 Experimental Specimens that Appeared Coarser after Using the NCAT Asphalt Content Tester

In some cases, when the mean differences were calculated for each sieve size after using the NCAT Asphalt Content Tester, the Experimental specimens appeared to be coarser. The 12.5 mm (1/2 inch) sieve from the Ralston aggregate source and the 12.5 mm (1/2 inch) and the 9.5 mm (3/8) sieve size from the Valco/Rocky Mountain aggregate source are examples of this. See Section 6.1.2 for an explanation of cases like these.

# 5.1.6 Summary of Results Using Analysis Method One

The results showing the ranges of the mean differences for the six different aggregate sources are shown in Figure 5.

Figure 5. Summary of the Gradation Results (Mean Differences, Analysis Method One)



Reviewing Figure 5 reveals that the ranges of the mean differences for the 54 sieve tests were generally less than 1.0 percent. Thirty three were less than 0.5 percent, eighteen were less than 1.0 percent, two were less than 1.5 percent and one was less than 2.0 percent.

Ninety four percent of the calculated mean differences for the percent passing each sieve screen were less than 1.0 percent. Only six percent of the mean differences were greater than 1.0 percent.

# 5.2 Analysis Method Two- Aggregate Gradation Results

The standard deviations were calculated using the percent differences from each of the 16 possible paired combinations between the four Experimental and four Control specimens for each individual sieve size. The single standard deviations from the precision statement in AASHTO T 27 were then subtracted from their respective sieve size standard deviations calculated from the 16 possible paired combinations.

# 5.2.1 AASHTO T 27 Precision (Single Operator)

The precision statement for an aggregate sample which was split one time is given in AASHTO procedure T 27. The precision (for a single operator) in

determining the gradation per aggregate size is given in Table 4.

The estimates of precision for the method listed in AASHTO T 27 are based on results from the AASHTO Materials Reference Laboratory Reference Sample Program, with testing conducted by this method and ASTM C 136. The data is based on the analyses of more than 100 paired test results from 40 to 100 laboratories. The values in the table are given for different ranges of percentage of aggregate passing one sieve and retained on the next finer sieve. The Table uses ASTM C 670 Practice for Preparing Precision Statements for Test Methods For Construction Materials (3). The data for the aggregate gradations tested in this study for the percent of aggregate passing one sieve and retained on the next finer sieve is shown on Table 5.

Table 4. Precision Statement from AASHTO T 27

		TABLE 1 Precision					
		Percent of Size			Acceptable Range of Test Results		
		Fraction Between Consecutive Sieves	Coefficient of Variation (IS percent), Percent <sup>8</sup>	Standard Deviation (1S), Percent <sup>4</sup>	(D2S percent) <sup>8</sup> Percent of Average	(D2S), <sup>A</sup> Percent	
	Coarse Aggregates: C						
	Single-Operator	0 to 3	30°	<u>-</u>	85°		
	Precision	3 to 10		1.4 <sup>D</sup>		4.0°	
		10 to 20		0.95		2.7	
		20 to 50		1.38	_	3.9	
	Multilaboratory	0 to 3	35°	_	99°	_	
	Precision	3 to 10		1.06		3.0	
		10 to 20		1.66		4.7	
	•	20 to 30		2.01		5.7	
	•	30 to 40		2.44		6.9	
	•	40 to 50		3.18		9.0	
	Fine Aggregates:						
	Single-Operator	0 to 3		0.14		0.4	
	Precision	3 to 10		0.43		1.2	
	• •	10 to 20		0.60		1.7	
		20 to 30		0.64		1.8	
		30 to 40		0.71		2.0	
	N. 6 - 1471 - 1 - 1 - 1 - 1 - 1 - 1	40 to 50	•	0.21		0.6	
Contraction of the first	Multilaboratory	0 to 3 3 to 10		0.21		1.6 41 4	1 +t 1
1.1 1.5	Precision	10 to 20		. 0.95		2.7	
		20 to 30		1.24		3.5	
		20 to 30 30 to 40		1.41		4.0	
	ON DAILY A	40 to 50	,				

••

A These numbers represent, respectively, the (1S) and (D2S) as described in ASTM C 670.

These numbers represent, respectively, the (1S percent) and (D2S percent) limits as described in ASTM C 670.

These numbers represent, respectively, the (1S percent) and (D2S percent) limits as described in ASTM C 670.

The precision estimates are based on coarse aggregates with nominal maximum size of 19.0 mm (% in.).

These values are from precision indices first included in T 27. Other indices were developed in 1982 from more recent AASHTO Materials Reference Laboratory sample data, which did not provide sufficient information to revise the values as noted.

Table 4 from the AASHTO T 27 procedure, allows a single standard deviation for the gradation blends used in this experiment with a range between 0.95 and 1.4 percent for coarse material and a range between 0.14 and 0.64 percent for fine material using a single operator. The values depend on the percentage passing one sieve and retained on the next finer sieve.

Table 5. Percent of Aggregate Passing One Sieve and Retained on the Next Finer Sieve for Each Aggregate Source

# FRANCISCOTTI EXPERIMENTAL

EXPERIMENTAL				• • • · · ·
SIEVE SIZE	AGGREGATE DESCRIPTION	PERCENT PASSING EACH SIEVE SIZE	PERCENT PASSING ONE SIEVE AND RETAINED ON THE NEXT FINER SIEVE	B AASHTO T 27 AFTER 1 SPLIT AGGREGATE ONLY 100 PAIRED TEST RESULTS
1/2 3/8	COARSE COARSE	99.66% 70.52%	20.440/	PRECISION (1S),%
#4	FINE	45.84%	29.14%	1.38
#8 #16 #30 #50 #100 #200	FINE FINE FINE FINE FINE FINE	33.61% 24.79% 17.36% 11.32% 7.30% 4.60%	24.69% 12.23% 8.82% 7.43% 6.04% 4.02% 2.69%	0.64 0.60 0.43 0.43 0.43 0.43

# WINDSOR/IRWIN

SIEVE SIZE	AGGREGATE	PERCENT PASSING	PERCENT PASSING ONE SIEVE	
	DESCRIPTION	<b>EACH SIEVE SIZE</b>	AND RETAINED ON THE	В .
			NEXT FINER SIEVE	AASHTO
				T 27
				AFTER 1 SPLI
				AGGREGATE
				ONLY
				100 PAIRED
				TEST RESULT
				PRECISION
				(1S),%
SIEVE SIZE			•	,,,,,,
1/2	COARSE	99.81%		
3/8	COARSE	80.17%	19.64%	0.95
#4	FINE	59.51%	20.66%	0.64
#8	FINE	43.91%	15.60%	0.60
#16	FINE	32.09%	11.82%	0.60
#30	FINE	22.67%	9.42%	0.43
#50	FINE	14.63%	8.05%	0.43
#100	FINE	9.16%	5.47%	0.43
#200	FINE	5.88%	3.28%	0.43

#### RALSTON EXPERIMENTAL

EXPERIMENTAL				
SIEVE SIZE	AGGREGATE DESCRIPTION	PERCENT PASSING EACH SIEVE SIZE	PERCENT PASSING ONE SIEVE AND RETAINED ON THE NEXT FINER SIEVE	B AASHTO T 27 AFTER 1 SPLIT AGGREGATE ONLY 100 PAIRED TEST RESULTS PRECISION (1S),% COMBINATIONS PRECISION
SIEVE SIZE				(D2S),%
1/2 3/8	COARSE COARSE	98.17% 81.19%	16.99%	0.05
#4	FINE	66.56%	14.63%	0.95 0.6
#8	FINE	41.61%	24.95%	0.64
#16	FINE	26.68%	14.93%	0.6
#30 #50	FINE	16.92%	9.77%	0.43
#50 #100	FINE FINE	8.99% 5.01%	7.93% 3.97%	0.43 0.43
#200	FINE	2.74%	2.28%	0.14
MONK EXPERIMENTAL SIEVE SIZE	AGGREGATE DESCRIPTION	PERCENT PASSING EACH SIEVE SIZE	PERCENT PASSING ONE SIEVE AND RETAINED ON THE NEXT FINER SIEVE	B AASHTO T 27 AFTER 1 SPLIT AGGREGATE ONLY 100 PAIRED TEST RESULTS PRECISION (1S),%
				(1.0),,,,
SIEVE SIZE 1/2 3/8 #4	COARSE COARSE FINE	99.29% 81.99% 64.10%	17.30% 17.89%	0.95
1/2 3/8 #4 #8	COARSE FINE FINE	81.99% 64.10% 41.67%	17.89% 22.43%	0.95 0.60 0.64
1/2 3/8 #4 #8 #16	COARSE FINE FINE FINE	81.99% 64.10% 41.67% 29.43%	17.89% 22.43% 12.24%	0.95 0.60 0.64 0.60
1/2 3/8 #4 #8 #16 #30	COARSE FINE FINE FINE FINE	81.99% 64.10% 41.67% 29.43% 21.19%	17.89% 22.43% 12.24% 8.24%	0.95 0.60 0.64 0.60 0.43
1/2 3/8 #4 #8 #16	COARSE FINE FINE FINE	81.99% 64.10% 41.67% 29.43%	17.89% 22.43% 12.24%	0.95 0.60 0.64 0.60

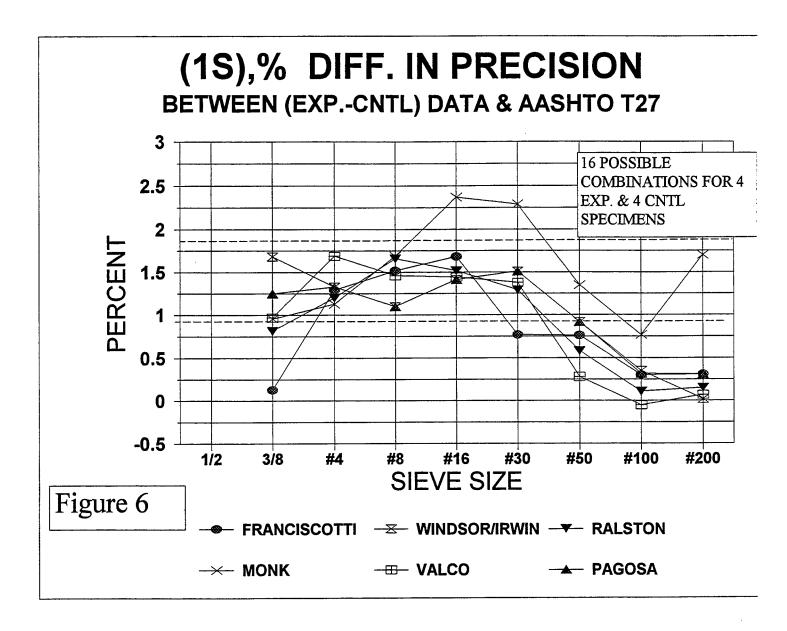
VALCO

VALCO EXPERIMENTAL				
SIEVE SIZE	AGGREGATE DESCRIPTION	PERCENT PASSING EACH SIEVE SIZE	PERCENT PASSING ONE SIEVE AND RETAINED ON THE NEXT FINER SIEVE	B AASHTO T 27 AFTER 1 SPLIT AGGREGATE ONLY 100 PAIRED TEST RESULTS PRECISION (1S),%
SIEVE SIZE  1/2 3/8 #4 #8 #16 #30 #50 #100 #200	COARSE COARSE FINE FINE FINE FINE FINE FINE	99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77%	25.64% 12.73% 15.91% 10.33% 9.37% 13.95% 6.85% 2.24%	1.38 0.60 0.60 0.60 0.43 0.60 0.43
PAGOSA EXPERIMENTAL SIEVE SIZE	AGGREGATE DESCRIPTION	PERCENT PASSING EACH SIEVE SIZE	PERCENT PASSING ONE SIEVE AND RETAINED ON THE NEXT FINER SIEVE	B AASHTO T 27 AFTER 1 SPLIT AGGREGATE ONLY 100 PAIRED TEST RESULTS PRECISION (1S),%
SIEVE SIZE  1/2 3/8 #4 #8 #16 #30 #50 #100 #200	COARSE COARSE FINE FINE FINE FINE FINE FINE FINE FIN	100.00% 75.54% 51.29% 36.74% 26.02% 18.76% 13.00% 8.80% 6.13%	24.46% 24.25% 14.55% 10.72% 7.26% 5.76% 4.20% 2.67%	1.38 0.64 0.60 0.60 0.43 0.43 0.46 0.14

5.2.2 (Experimental - Control) Data Minus AASHTO T 27 (Single Standard Deviation Data)

Figure 6 represents the differences between the standard deviations for the aggregate specimens that were split three times, mixed with asphalt cement, and then heated inside the NCAT Asphalt Content Tester minus the single split precision of a paired aggregate sample. The differences in the standard deviations are due to the splitting, mechanical mixing, and heating of the aggregate inside the NCAT Asphalt Content Tester. There appears to be between 0.9 percent to 1.75 percent difference for the 9.5 mm (3/8), 4.75 mm (#4), 2.36 mm (#8), 1.18 mm (#16), and 0.60 mm (#30) sieves. There is less of a difference for the smaller sieve sizes of between 0.0 and 0.75 percent difference for the 0.30 mm (#50), 0.15 mm (#100) and the 0.075 mm (#200) sieve sizes.

Figure 6. (Experimental - Control Data) Minus AASHTO T 27 (Single Standard Deviation Data)

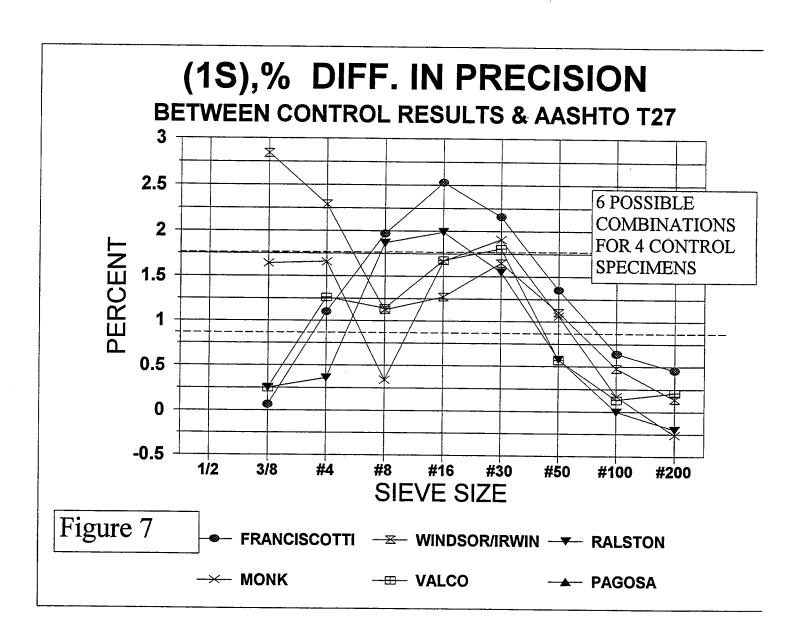


#### 5.2.3 Control Data Minus AASHTO T 27 (Single Standard Deviation Data)

In a attempt to measure the error induced when the aggregate was split three times the standard deviations of the percent differences were also calculated from the six possible paired combinations using the four Control specimens only.

The single standard deviations from the precision statement in AASHTO T 27 were also subtracted from the standard deviations of each respective sieve size from the six possible paired combinations. The results are illustrated in Figure 7. Figure 7 represents the (Control specimens) aggregate that were split three times but not mixed with asphalt cement or heated inside the NCAT Asphalt Content Tester.

Figure 7. Control Data Minus AASHTO T 27 (Single Standard Deviation Data)

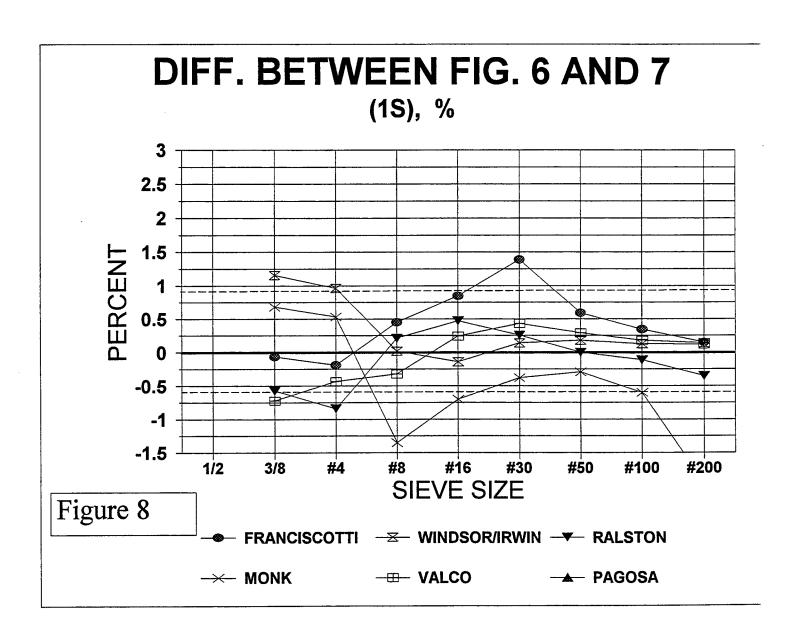


# 5.2.4 (Single Standard Deviation Data, Figure 8)

In an attempt to reveal the effects that the ignition oven may have had on the aggregate, the differences between the standard deviations for Figure 6 and Figure 7 were determined.

The differences between the single standard deviations for Figure 6 and Figure 7 are illustrated in Figure 8.

Figure 8. Difference Between Figure 6 and Figure 7 (Single Standard Deviation)



## 5.2.5 Summary of Results Using Analysis Method Two

The area which contains the majority of the points plotted for the percent difference in precision were reduced from a upper and lower range of +0.75 to +1.8 percent for Figure 6 to a upper and lower range of -0.6 to +0.6 percent for Figure 8. The percent differences in standard deviations were significantly reduced when the error due to splitting was alleviated.

#### **5.3 Application of Correction Factors**

Correction factors may be required to compensate for possible aggregate degradation inside the ignition oven.

Note: The data obtained from this experiment represents only the aggregate that was tested, individual aggregates should be tested separately for their susceptibility to degradation when placed inside the NCAT Asphalt Content Tester. Anyone using the ignition oven to determine aggregate gradation from a bituminous mixture should be aware of the possibility that aggregate sources other than the ones used in this study may degrade more under the high temperatures present inside the NCAT Asphalt Content Tester.

### 5.3.1 Testing for the Possibility of Aggregate Degradation

Aggregate degradation may be tested for by splitting a sample of a known gradation one time, producing paired specimens. The sample shall meet the minimum test weight requirements specified by AASHTO 27 (Section 6.4 - Sampling). One of the paired aggregate specimens shall be mixed with the appropriate amount of water and hydrated lime and dried in an exhaust oven at the proper mixing temperature along with the asphalt sample. The aggregate specimen and the asphalt sample shall be removed from the

exhaust oven and mixed with the asphalt using a mechanical mixer. The bituminous mixture is than heated inside the ignition oven and tested. The other paired specimen shall be treated as the Control specimen as specified in Section 4.0 of this paper.

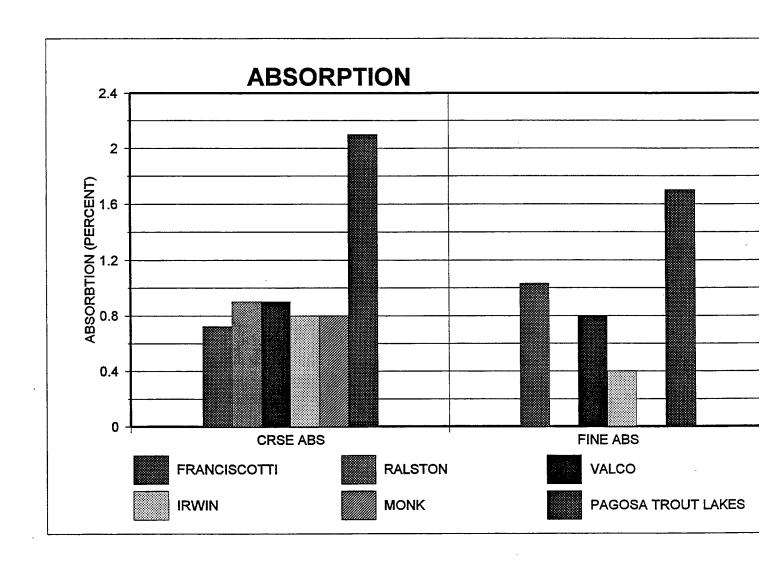
This procedure shall be repeated three times using three separate known aggregate gradation samples from the same source. The percent differences from each sieve size for the paired specimens shall be calculated for each of the three samples. The standard deviation shall be calculated using the results of the percent differences between the Control and Experimental specimens.

If the standard deviation calculated for the three samples exceeds the single standard deviation (1S),% limits as stated in AASHTO T 27, a correction factor will be required. The correction factor will be equal to the calculated standard deviation minus single standard deviation stated in AASHTO T 27. A correction factor will be required on any sieve size in which the calculated standard deviation for that sieve exceeds the (1S),% single standard deviation limits set fourth in the precision statement of AASHTO T 27. See Appendix D for the correction factors that were required using Analysis Method Two. See FUTURE RESEARCH Section 9.0 for additional information regarding this subject.

#### **5.4 Aggregate Absorption Values**

The porosity of an aggregate is generally indicated by the amount of water it absorbs when soaked in water. A porous aggregate will also absorb asphalt which will tend to make a bituminous mixture dry or less cohesive. The aggregate sources with higher absorption values did not demonstrate more degradation than aggregate sources with lower absorption values. Absorption values for the aggregate sources evaluated are shown in Table 1. The absorption values for each aggregate source are illustrated as follows on the following page.

Figure 9. Absorption Values for Each Aggregate Source



## 6.0 CONCLUSION

#### 6.1 Analysis Method One

6.1.1 Mean Differences Between The Experimental and Control Specimen

Gradations

The residual aggregate from the Experimental specimens were found to be finer than the Control specimens after performing a gradation analysis (45 out of the 54 sieve tests. This would indicate that there was some degradation caused by the NCAT Asphalt Content Tester or through the mechanical mixing process. However, the mean differences for the percent passing each sieve size between the Experimental and Control specimens were relatively low (less than 1.5 percent for nearly all the sieve sizes analyzed from each aggregate source).

6.1.2 Experimental Specimens that Appeared to be Coarser after Using the NCAT Asphalt Content Tester

In a few instances (see Section 5.1.5) the Experimental specimens appeared to be more coarse (less material passed through the sieves) after using the NCAT Asphalt Content Tester, this was a probably a result of the splitting or mechanical mixing process and <u>not</u> due to the ignition oven.

#### 6.1.3 Possible Reasons for the Variation in Gradation Results

Possible reasons for the variances in gradation include several factors such as high temperature degradation, mechanical mixing and the splitting process.

#### 6.1.4 Student's t-test

The data from each from the different sieve sizes for each of the aggregate sources clearly demonstrates the t-test statistic (t) is less than the t critical two tail. This means that one can be 95% confident that the two data sets came from the same population set. (See Appendix B).

#### 6.1.5 Summary of Analysis Method One

Since the mean differences between the Experimental and the Control specimens for the percent passing each sieve size were less than 1.5 percent for nearly all the sieve sizes analyzed (coarse and fine aggregate) it may be deduced that heating the six bituminous mixture sources using the NCAT Asphalt Content Tester had only a small affect on the gradation. The gradations between the Experimental and the Control specimens were not statistically different.

#### 6.2 Analysis Method Two (One to One Comparison)

6.2.1 (Experimental - Control) Data Minus AASHTO T 27 Gradation Data (Single Standard Deviation)

The differences in the single standard deviations for all of the sieve sizes ranged between 0.0 to 2.5 percent. The differences were due to either the splitting, mechanical mixing or aggregate breakdown inside the NCAT Asphalt Content Tester or a combination of all these effects.

6.2.2 Control Data Minus AASHTO T 27 Gradation Data (Single Standard Deviation)

The standard deviations for each sieve size were calculated after the percent differences were determined by combining different paired specimens using only the Control specimens. The standard deviations from each sieve size was subtracted from each of the AASHTO T 27 standard deviations respectively. The result of this subtraction represent the affect on the standard deviations for each sieve size after the aggregate was split three times. Nearly all of the significant differences between the standard deviations for the Control specimens and the AASHTO T 27 data were alleviated. (See Section 6.2.3) Therefore, it may be deduced that any

difference between the single standard deviations given in AASHTO T 27 and the standard deviations calculated for the Control data was due to the error induced when the aggregate sample was split three consecutive times using a riffle splitter.

#### 6.2.3 Figure 8 (Single Standard Deviation)

As shown in Figure 8, the percent differences between the standard deviations straddled the zero percent line. This would indicate that the percent differences measured were due largely to the differences caused when the aggregate sample was split three times, and not due to the mechanical mixing or heating of the aggregate inside the NCAT Asphalt Content Tester. This would also indicate that the aggregate did not degrade excessively after using the ignition oven. When the differences between the standard deviations for Figure 6 and 7 were compared to the standard deviations given in AASHTO T 27 only a small number of sieve sizes required a correction factor. Most of the correction factors were less than 1.0 percent. The correction factors that were required may be found in Appendix D.

#### **6.3 Absorption Values**

The absorption values of the aggregates that were tested did not appear to

have affected the results of the gradations after using the NCAT Asphalt

Content Tester after the moisture was removed per Section 4.4. The

gradations of the aggregates with high absorption values were not noticeably

different from the aggregate with low absorption values.

#### **6.4 Summary of Analysis Methods One and Two**

It may be deduced from analysis methods One and Two that the NCAT
Asphalt Oven may have caused a slight amount of aggregate degradation.
However, only a small number of the sieves required any correction factor, almost all correction factors were less than 1.0 percent. The test method listed in Section 5.3.1 may be used to determine the degree of aggregate degradation.

#### 7.0 RECOMMENDATION

- \* The NCAT Asphalt Content Tester may be used for determining gradations of bituminous mixtures.
- \* Use of the NCAT Asphalt Content Tester can replace the use of chlorinated solvents for determination of AC content and aggregate gradation.
- \* Correction factors will be required for aggregate that is found to degrade inside the NCAT Asphalt Content Tester. See Section 5.3. Exceeding the precision limits set fourth in AASHTO T 27 shall be used as a reference in determining the requirement for gradation correction factors. Some types of aggregate (e.g. aggregate which contains oil shale on the Colorado West slope) may degrade excessively and unpredictably inside the ignition oven. For these types of aggregate the ignition oven may not be effective in determining gradation.

# **8.0 FUTURE RESEARCH**

Aggregate degradation research may also be conducted by using only one aggregate specimen, without adding asphalt cement. This could be done by comparing the gradation of the specimen before using the ignition oven to the gradation after heating the same aggregate specimen inside the ignition oven for specified amount of time. This would provide a more instantaneous and time efficient method, if a technician in the field is questioned or suspects aggregate degradation (due to the particular mineralogy) is taking place when the specimen is heated inside the ignition oven.

Note: This method would not account for the elevated temperatures that would be present inside the oven chamber when asphalt cement is mixed with the aggregate. These temperatures would typically exceed the oven chamber set point of 538° C (1000° F).

## 9.0 REFERENCES

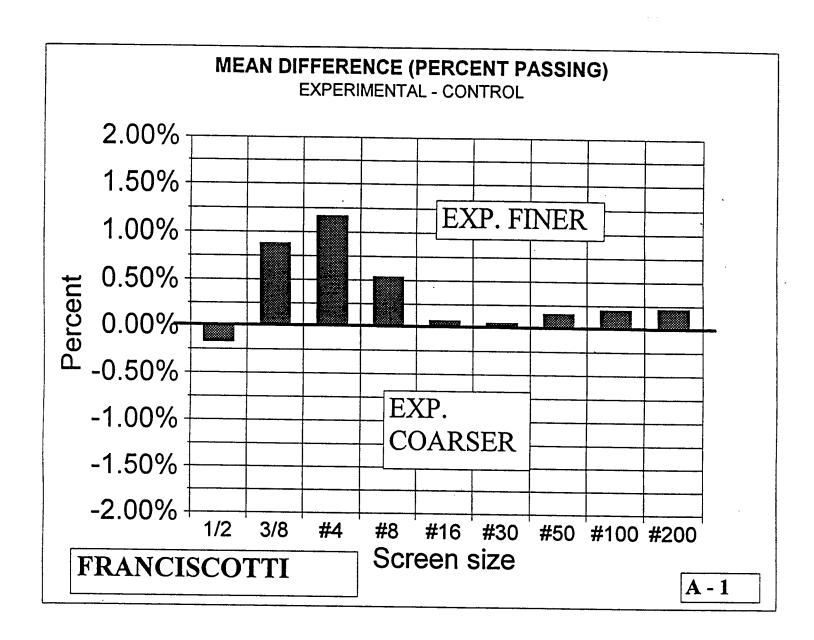
- (1) Snedecor, W.G., and W.G. Cochran, Comparison of Two Samples, Chapter 6, Statistical Methods Eighth Edition. Iowa State Press, Ames Iowa 50010 1989, pp 84-86.
- (2) 1995 Standard Specifications for Transportation Materials and Methods of Sampling and Testing, Seventeenth Edition, AASHTO T 27 Section 10.0 precision, pp 30-31.
- (3) 1996 ANNUAL BOOK OF ASTM STANDARDS, Concrete and Aggregates

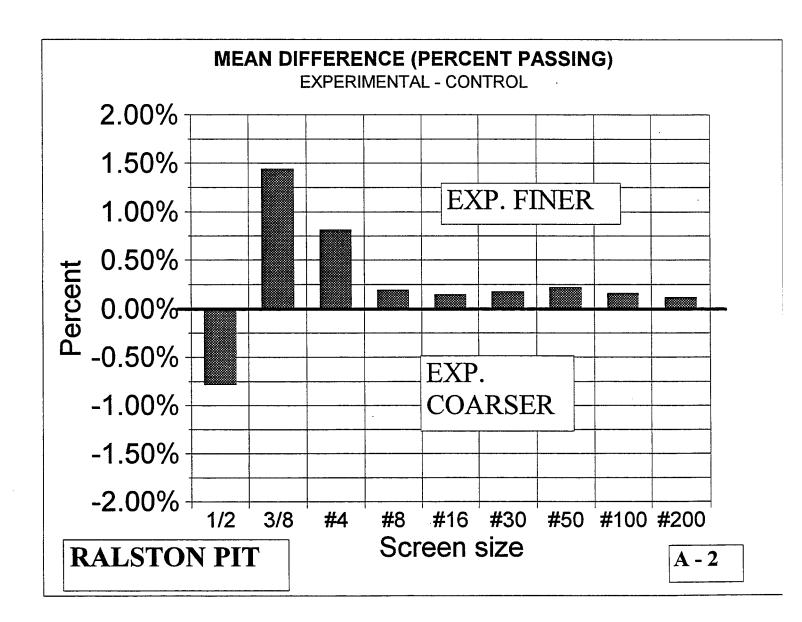
  Volume 04.02, C 670 91a Standard Practice for Preparing Precision and Bias

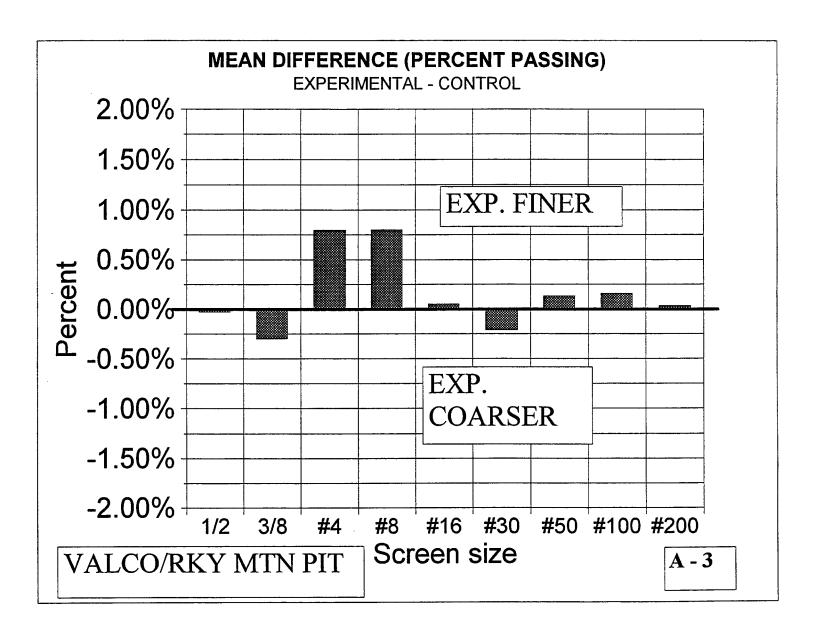
  Statements for Test Methods for Construction Materials pp 48-49.

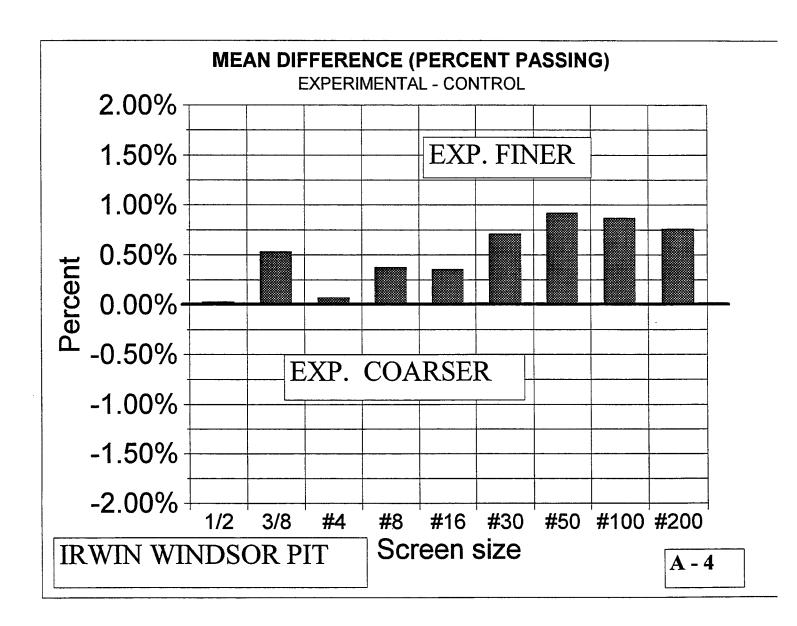
# APPENDIX A

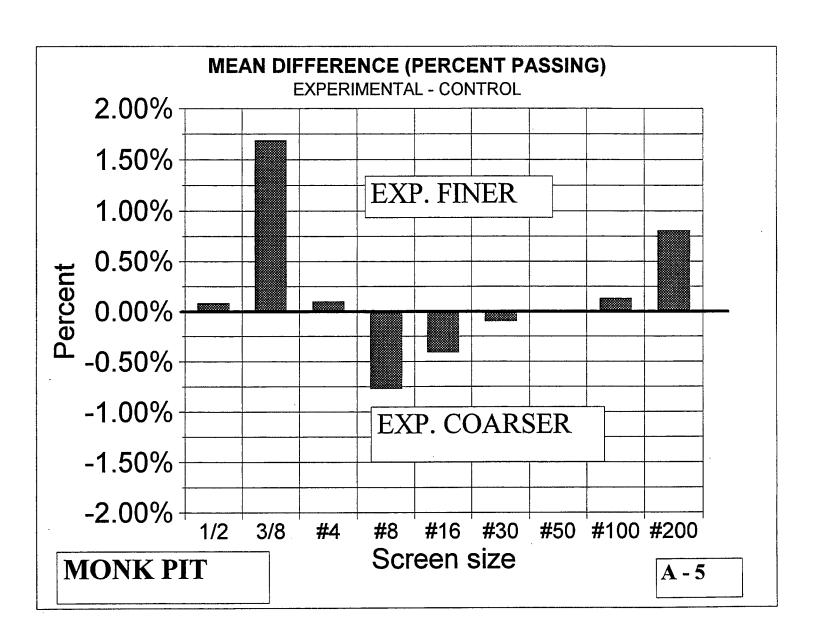
- \* Mean Difference Figures for Aggregate Sources
  - \* Data Used to Calculate Mean Differences

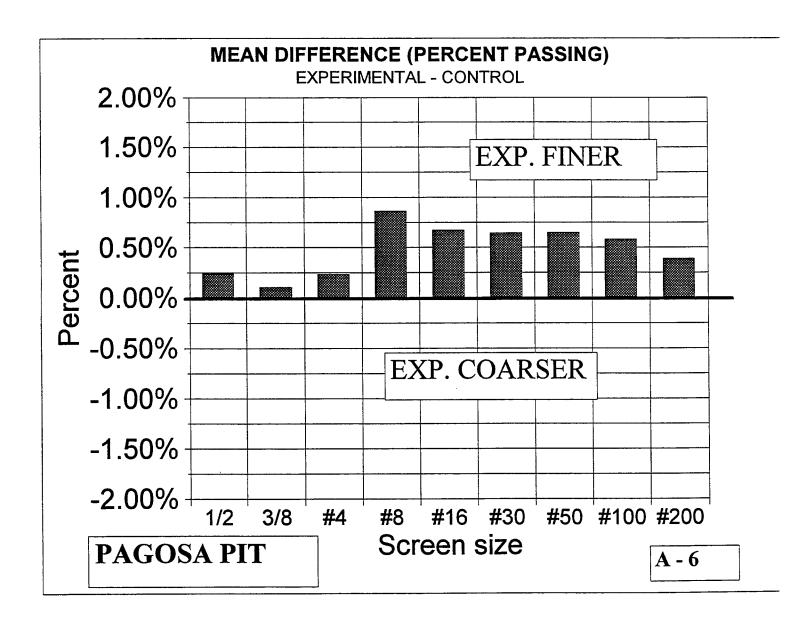












## **DATE: 8-13-96**

# SUMMARY OF t- TEST PAIRED TWO-SAMPLE FOR MEANS AND GRADATION RESULTS

GRADATION COMPARISON OF AGGREGATE MIXED WITH ASPHALT AND PLACED IN NCAT ASPHALT CONTENT OVEN (EXPERIMENTAL) VS.
THE SAME AGGREGATE LEFT IN IT'S ORIGINAL STATE (CONTROL).

SIX AGGREGATE SOURCES ANALYZED

STUDENTS T - TEST EMPLOYED

PROBABILITY OF A LARGER VALUE

 $P(T \le t)$  two-tail: > .05

## FRANCISSCOTTI PIT:

## **EXPERIMENTAL**

CIEVE CIZE

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
596X-1	99.49%	71.45%	46.37%	32.88%	24.16%	17.23%	11.32%	7.27%	4.53%
596X-2	99.41%	69.52%	45.01%	33.65%	24.84%	17.34%	11.30%	7.35%	4.73%
596X-3	99.73%	70.47%	46.14%	33.72%	24.46%	16.77%	10.82%	6.98%	4.38%
596X-4	100.00%	70.66%	45.83%	34.17%	25.69%	18.11%	11.83%	7.59%	4.76%
MEAN	99.66%	70.52%	45.84%	33.61%	24.79%	17.36%	11.32%	7.30%	4.60%
STD DEV	0.26%	0.79%	0.59%	0.53%	0.66%	0.55%	0.41%	0.25%	0.18%
•				·					
CONTROL									
CONTROL									
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
596X-5	99.59%	67.61%	42.44%	30.68%	22.43%	15.40%	9.78%	6.16%	3.78%
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	19.04%	12.45%	7.88%	4.80%
596X-7	100.00%	69.59%	44.26%	31.81%	23.13%	16.02%	10.40%	6.75%	4.25%
596X-8	99.72%	71.11%	47.45%	35.91%	26.94%	18.78%	12.00%	7.58%	4.69%
44P 4 M									
MEAN	99.8%	69.6%	44.7%	33.1%	24.7%	17.3%	11.2%	7.1%	4.4%
STD DEV	0.2%	1.5%	2.1%	2.3%	2.3%	1.9%	1.3%	0.8%	0.5%
MEAN DIFF	-0.2%	0.9%	1.2%	0.5%	0.1%	0.1%	0.2%	0.20/	0.20/
s sub D bar	0.18%	1.05%	1.17%	0.93%	0.85%	0.1%	0.56%	0.2%	0.2%
Mean DIFF + 3.18	0.40%	4.21%	4.88%	3.50%	2.77%			0.34%	0.18%
Mean DIFF - 3.18	-0.75%	-1.7%	-1.7%	-1.7%	-2.0%	2.53%	1.94%	1.28%	0.79%
f	-0.9457	0.8431	1.0010	0.5779		-1.9%	-1.2%	-0.6%	-0.2%
t critical two- tail	3.1824	3.1824	3.1824		0.0881	0.0675	0.2831	0.6005	1.2101
T CHICAL DAO_ Tall	'4 '3 X') //	2 1 2 7 4	2 1 2 2 2	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824

# RALSTON PIT: EXPERIMENTAL

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	97.60%	79.72%	65.03%	41.77%	27.93%	18.37%	10.02%	5.62%	3.01%

NCAT-1 98.23% 62.45% 68.90% 40.10% 24.91% 15.42% 8.09% 4.55% 2.45%										
NCAT-3 98.11% 80.78% 65.69% 40.10% 24.919% 15.42% 8.09% 4.55% 2.65% 2.93%	NCAT-2	98.76%	81.80%	66.62%	41.02%	26.01%	16.29%	8.48%	4.65%	2.44%
MEAN 98.23% 82.45% 68.90% 43.55% 27.88% 17.59% 9.35% 5.24% 2.93% MEAN 98.17% 81.19% 66.56% 41.61% 26.68% 16.92% 8.99% 5.01% 2.74% STD DEV 0.5% 1.2% 1.7% 1.5% 1.5% 1.3% 0.9% 5.01% 2.74% 0.3% CONTROL SIEVE SIZE 1/2 3/8 #4 #8 #16 #30 #50 #100 #200 mon-NCAT-5 99.08% 77.93% 64.19% 39.97% 25.14% 15.68% 8.22% 4.54% 2.43% non-NCAT-6 98.96% 79.61% 66.05% 39.76% 24.77% 15.39% 8.08% 4.60% 2.55% non-NCAT-7 99.08% 81.77% 66.05% 39.76% 24.77% 15.39% 8.08% 4.60% 2.55% non-NCAT-8 98.69% 81.77% 66.05% 39.76% 24.73% 15.39% 8.08% 4.60% 2.55% non-NCAT-8 98.69% 81.77% 66.05% 39.76% 24.75% 15.39% 8.08% 4.60% 2.55% non-NCAT-8 99.09% 79.65% 66.05% 39.76% 24.75% 15.39% 8.08% 4.60% 2.55% non-NCAT-8 98.69% 81.77% 66.71% 43.18% 28.40% 18.15% 9.48% 5.22% 2.63% NEAN DIFF 3.18 0.2% 1.5% 1.5% 1.8% 1.8% 1.4% 0.7% 0.2% 0.2% 0.2% 0.2% 0.2% 0.2% 0.2% 0.2	NCAT-3	98.11%	80.78%	65.69%	40.10%	24.91%	15.42%	8.09%		
MEAN   98.17%   81.19%   66.56%   41.61%   26.68%   16.92%   8.99%   5.01%   2.74%   STD DEV   0.5%   1.2%   1.7%   1.5%   1.5%   1.3%   0.9%   0.5%   0.3%   0.3%   CONTROL	NCAT-4	98.23%	82.45%	68.90%	43.55%	27.88%	17.59%	9.35%		
CONTROL  SIEVE SIZE 1/2 3/8 #4 #8 #16 #30 #50 #100 #200 mon-NCAT-5 99.08% 79.63% 66.05% 39.76% 25.14% 15.68% 8.22% 4.54% 2.43% non-NCAT-6 98.96% 79.61% 66.04% 42.76% 27.84% 17.75% 9.30% 5.04% 2.53% non-NCAT-7 99.08% 79.65% 66.05% 39.76% 24.77% 15.38% 8.08% 4.00% 2.63% non-NCAT-8 98.96% 79.65% 66.05% 39.76% 24.77% 15.38% 8.08% 4.00% 2.63% non-NCAT-8 98.95% 79.65% 66.05% 39.76% 24.77% 15.38% 8.08% 4.00% 2.63% non-NCAT-8 98.95% 79.75% 65.75% 41.42% 26.54% 16.74% 8.77% 4.85% 2.266% XITD DEV 0.2% 1.6% 1.1% 1.8% 1.8% 1.8% 1.4% 0.7% 0.33% 0.2% MEAN DIFF - 0.8% 1.4% 0.8% 0.2% 0.1% 1.0% 1.0% 0.6% 0.3% 0.2% 0.1% sub D bar 0.3% 0.3% 0.5% 0.76% 1.0% 1.0% 1.0% 1.0% 0.6% 0.3% 0.5% 0.50% 2.75% 3.24% 2.00% 1.19% 0.64% Mean DIFF - 3.18: -1.68% 0.36% -0.87% -2.13% -2.95% -2.89% -1.57% 0.08% -0.41% t -2.7599 4.2590 1.5376 0.2640 0.1508 0.1620 0.3872 0.5009 0.7109 t critical two-tail 3.1824										
CONTROL  SIEVE SIZE 1/2 3/8 #4 #8 #16 #30 #50 #100 #200 mon-NCAT-5 99.08% 77.93% 64.19% 39.97% 25.14% 15.68% 8.22% 4.54% 2.53% non-NCAT-4 98.96% 79.61% 66.04% 42.76% 27.84% 17.75% 9.30% 50.4% 2.59% non-NCAT-5 99.08% 76.69% 66.05% 39.76% 24.77% 15.39% 8.08% 4.60% 2.53% non-NCAT-5 99.08% 78.66% 66.05% 39.76% 24.77% 15.39% 8.08% 4.60% 2.53% non-NCAT-8 98.69% 81.77% 66.71% 43.18% 28.40% 18.15% 9.48% 5.22% 4.85% 28.35% 25.24% 1.0.00% 79.65% 65.75% 41.42% 26.54% 16.74% 8.77% 4.85% 2.83% Non-NCAT-8 98.69% 1.4% 0.8% 0.2% 0.1% 1.9% 1.6% 1.9% 1.8% 1.8% 1.4% 0.7% 0.3% 0.2% 0.2% 0.2% 0.1% sub D bar 0.3% 0.3% 0.5% 0.75% 0.7% 1.0% 1.0% 0.6% 0.3% 0.2% 0.80% Mean DIFF + 3.18 0.12% 2.52% 2.55% 2.55% 2.55% 3.25% 3.24% 2.00% 1.19% 0.64% Mean DIFF + 3.18 0.12% 2.52% 2.50% 2.51% 3.25% 3.24% 2.00% 1.19% 0.64% Mean DIFF + 3.18 0.12% 3.1824	MEAN	98.17%	81.19%	66.56%	41.61%	26.68%	16.92%	8.99%	5.01%	2.74%
CONTROL  SIEVE SIZE 1/2 3/8 #4 #8 #16 #30 #50 #100 #200  non-NCAT-5 99.08% 77.93% 64.19% 39.97% 25.14% 15.68% 8.22% 4.54% 2.43% non-NCAT-6 99.08% 79.61% 66.04% 42.76% 27.84% 17.75% 93.0% 5.04% 2.59% non-NCAT-7 99.08% 79.65% 66.05% 39.76% 24.77% 15.39% 8.08% 46.0% 2.53% non-NCAT-8 86.69% 81.77% 66.71% 43.18% 28.40% 18.15% 9.46% 5.22% 2.83% non-NCAT-8 90.69% 79.75% 65.75% 41.42% 26.54% 16.74% 8.77% 4.85% 2.62% STD DEV 0.2% 1.6% 1.1% 1.8% 1.8% 1.4% 0.7% 0.3% 0.2% STD DEV 0.2% 1.6% 1.1% 1.8% 1.8% 1.4% 0.7% 0.3% 0.2% MEAN DIFF - 0.8% 1.4% 0.8% 0.2% 0.1% 0.2% 0.2% 0.2% 0.1% 0.3% 0.5% 0.7% 1.0% 1.0% 0.6% 0.3% 0.2% Mean DIFF +3.18 0.12% 2.52% 2.50% 2.51% 3.25% 3.24% 2.00% 1.19% 0.64% Mean DIFF -3.18: -1.68% 0.38% -0.87% -2.13% -2.95% -2.89% -1.57% 0.68% 0.41% 0.2% 0.2540 0.15% 0.380 0.3% 0.2% VALCO/ROCKY MOUNTAIN/CAS PIT:  CONTROL  1/2 3/8 #4 #8 #16 #30 #50 #100 #200 0.370 0.3% 0.2% VALCO/ROCKY MOUNTAIN/CAS PIT:  CONTROL  1/2 3/8 #4 #8 #16 #30 #50 #100 #200 0.370 0.3% 0.2% NON NCAT-5 100.00% 75.67% 61.88% 45.32% 35.54% 26.49% 12.05% 5.00% 2.78% NON NCAT-5 100.00% 75.67% 61.68% 45.32% 35.54% 26.49% 12.05% 5.00% 2.78% NON NCAT-5 100.00% 75.67% 61.68% 45.32% 35.54% 26.49% 12.05% 5.00% 2.58% NON NCAT-5 100.00% 75.67% 61.68% 45.32% 35.54% 26.49% 12.05% 5.00% 2.78% NON NCAT-5 100.00% 75.67% 61.68% 45.32% 35.54% 26.49% 12.05% 5.00% 2.78% NON NCAT-3 99.57% 75.41% 60.13% 44.37% 35.00% 25.71% 11.43% 4.61% 2.55% NCAT-2 99.82% 72.94% 60.56% 45.85% 36.97% 27.68% 12.58% 5.29% 3.03% NON NCAT-3 99.55% 75.44% 60.65% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.24% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26%	STD DEV	0.5%	1.2%	1.7%	1.5%	1.5%	1.3%	0.9%		
SIEVE SIZE										0.070
	CONTROL									
					#8		#30	#50	#100	#200
							15.68%		4.54%	2.43%
MEAN   98.95%   79.75%   66.71%   43.18%   28.40%   18.15%   9.48%   5.22%   2.83%							17.75%		5.04%	2.59%
MEAN 98.95% 79.75% 65.75% 41.42% 26.54% 16.74% 8.77% 4.85% 2.62% STD DEV 0.2% 1.6% 1.1% 1.8% 1.8% 1.4% 0.7% 0.3% 0.2% 0.2% MEAN DIFF -0.8% 1.4% 0.8% 0.2% 0.1% 0.2% 0.2% 0.6% 0.3% 0.2% Mean DIFF +3.18 0.12% 2.52% 2.50% 2.51% 3.25% 3.24% 2.00% 1.19% 0.64% 0.41% 0.2% 0.2% 0.1% 0.6% 0.3% 0.2% Mean DIFF +3.18 0.12% 2.52% 2.50% 2.51% 3.25% 3.24% 2.00% 1.19% 0.64% 0.41% 0.2% 0.2% 0.2% 0.2% 0.2% 0.2% 0.2% 0.2					39.76%	24.77%	15.39%	8.08%	4.60%	2.63%
STD DEV 0.2% 1.6% 1.1% 1.8% 1.8% 1.4% 0.7% 0.3% 0.2% 0.2% MEAN DIFF -0.8% 1.4% 0.8% 0.2% 0.1% 0.2% 0.2% 0.2% 0.1% 0.3% 0.3% 0.5% 0.5% 0.7% 1.0% 1.0% 0.6% 0.3% 0.3% 0.2% Mean DIFF +3.18 0.12% 2.52% 2.50% 2.51% 3.25% 3.24% 2.00% 1.19% 0.64% Mean DIFF -3.18; -1.68% 0.36% -0.67% -2.13% -2.95% -2.89% -1.57% -0.86% -0.41% t -2.7599 4.2590 1.5376 0.2640 0.1508 0.1820 0.3872 0.5009 0.7109 t critical two- tail 3.1824 3.1	non-NCAT-8	98.69%	81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2.83%
STD DEV 0.2% 1.6% 1.1% 1.8% 1.8% 1.4% 0.7% 0.3% 0.2% 0.2% MEAN DIFF -0.8% 1.4% 0.8% 0.2% 0.1% 0.2% 0.2% 0.2% 0.1% 0.3% 0.3% 0.5% 0.5% 0.7% 1.0% 1.0% 0.6% 0.3% 0.3% 0.2% Mean DIFF +3.18 0.12% 2.52% 2.50% 2.51% 3.25% 3.24% 2.00% 1.19% 0.64% Mean DIFF -3.18; -1.68% 0.36% -0.67% -2.13% -2.95% -2.89% -1.57% -0.86% -0.41% t -2.7599 4.2590 1.5376 0.2640 0.1508 0.1820 0.3872 0.5009 0.7109 t critical two- tail 3.1824 3.1										
MEAN DIFF										2.62%
s sub D bar	STD DEV	0.2%	1.6%	1.1%	1.8%	1.8%	1.4%	0.7%	0.3%	0.2%
s sub D bar	MEAN DIFF	-0.8%	1 4%	0.8%	0.2%	0.1%	0.2%	0.2%	0.2%	0.1%
Mean DIFF + 3.18         0.12%         2.52%         2.50%         2.51%         3.25%         3.24%         2.00%         1.19%         0.64%           Mean DIFF - 3.18:         -1.68%         0.36%         -0.87%         -2.13%         -2.95%         -2.889%         -1.57%         -0.86%         -0.41%           t         -2.7599         4.2590         1.5376         0.2640         0.1508         0.1820         0.3872         0.5009         0.7109           t critical two- tail         3.1824										
Mean DIFF - 3.18:         -1.68%         0.36%         -0.87%         -2.13%         -2.95%         -2.89%         -1.57%         -0.86%         -0.41%           t         -2.7599         4.2590         1.5376         0.2640         0.1508         0.1820         0.3872         0.5009         0.7109           VALCO/ROCKY MOUNTAIN/CAS PIT:           CONTROL           1/2         3/8         #4         #8         #16         #30         #50         #100         #200           NON NCAT-5         100.00%         75.67%         61.68%         45.32%         35.54%         26.49%         12.05%         5.00%         2.78%           NON NCAT-6         99.51%         73.90%         59.11%         43.30%         33.20%         24.21%         10.84%         4.49%         2.54%           NON NCAT-7         99.76%         75.41%         61.56%         45.86%         36.79%         27.68%         12.58%         5.29%         3.03%           NOAN NCAT-7         99.76%         75.41%         61.56%         44.37%         35.00%         25.71%         11.43%         4.61%         2.56%           MEAN         99.82%         74.45%         60.62%         44.71%										
t critical two-tail 3.1824 3.1										
t critical two-tail 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824  VALCO/ROCKY MOUNTAIN/CAS PIT:  CONTROL  1/2 3/8 #4 #8 #16 #30 #50 #100 #200  NON NCAT-5 100.00% 75.67% 61.68% 45.32% 35.54% 26.49% 12.05% 5.00% 2.78% NON NCAT-6 99.51% 73.90% 59.11% 43.30% 33.20% 24.21% 10.84% 4.49% 2.54% NON NCAT-7 99.76% 75.41% 61.56% 45.86% 36.79% 27.68% 12.58% 5.29% 3.03% NON NCAT-8 100.00% 72.81% 60.13% 44.37% 35.00% 25.71% 11.43% 4.61% 2.56%  MEAN 99.82% 74.45% 60.62% 44.71% 35.13% 26.02% 11.73% 4.85% 2.73% STD DEV 0.2% 1.3% 1.2% 1.1% 1.5% 1.5% 0.8% 0.4% 0.2%  EXPERIMENTAL  NCAT-1 100.00% 71.69% 60.00% 43.43% 33.15% 24.23% 11.29% 4.86% 2.75% NCAT-2 99.62% 72.94% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.29% 60.34% 44.62% 34.36% 25.03% 11.39% 4.81% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80%  MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80%  MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.0%  MEAN DIFF -0.0258%										
VALCO/ROCKY MOUNTAIN/CAS PIT:  CONTROL  1/2 3/8 #4 #8 #16 #30 #50 #100 #200  NON NCAT-5 100.00% 75.67% 61.68% 45.32% 35.54% 26.49% 12.05% 5.00% 2.78% NON NCAT-6 99.51% 73.90% 59.11% 43.30% 33.20% 24.21% 10.84% 4.49% 2.54% NON NCAT-7 99.76% 75.41% 61.56% 45.86% 36.79% 27.68% 12.58% 5.29% 3.03% NON NCAT-8 100.00% 72.81% 60.13% 44.37% 35.00% 25.71% 11.43% 4.61% 2.56%  MEAN 99.82% 74.45% 60.62% 44.71% 35.13% 26.02% 11.73% 4.85% 2.73% STD DEV 0.2% 1.3% 1.2% 1.1% 1.5% 1.5% 0.8% 0.4% 0.2%  EXPERIMENTAL  NCAT-1 100.00% 71.69% 60.00% 43.43% 33.15% 24.23% 11.29% 4.86% 2.75% NCAT-2 99.62% 72.94% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.29% 60.34% 44.62% 34.36% 25.03% 11.39% 4.81% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80%  MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.0%  MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.0%  MEAN 19FF -0.0258%	•									
1/2   3/8   #4   #8   #16   #30   #50   #100   #200	t ontiour two- tan									
NON NCAT-5		' MOUNT	'AIN/CAS	S PIT:						
NON NCAT-5 NON NCAT-6         100.00% 99.51%         75.67% 73.90%         61.68% 59.11%         45.32% 43.30%         35.54% 33.20%         26.49% 24.21%         12.05% 10.84%         5.00% 4.49%         2.78% 2.54%           NON NCAT-7 NON NCAT-8         99.76%         75.41% 75.41%         61.56% 60.13%         45.86% 44.37%         35.00% 35.00%         27.68% 25.71%         12.58% 11.23%         5.29% 4.61%         30.3% 25.67%           MEAN STD DEV         99.82% 0.2%         74.45% 1.3%         60.62% 1.2%         44.71% 1.1%         35.13% 1.5%         26.02% 11.5%         11.73% 0.88%         4.85% 0.4%         2.73% 0.4%           EXPERIMENTAL           NCAT-1 NCAT-2         99.62% 99.62%         72.94% 60.56%         60.56% 45.85% 36.40%         27.19% 27.19%         12.62% 5.26%         5.26% 11.39%         24.23% 4.81%         11.29% 2.62%         4.86% 5.26%         2.75% 2.75%           NCAT-2         99.62% 72.94%         60.56% 60.34%         44.62% 45.85%         36.40% 34.36%         25.03% 25.03%         11.39% 4.81%         2.75% 2.66%           NCAT-3         99.55% 75.29%         60.34% 64.67%         44.62% 34.36%         35.18% 25.81%         25.81% 11.86%         5.01% 5.10%         2.77% 2.80%           MEAN DIFF SSUD DEV         0.29% 2.3%         0.7965% 2.23%         0.7997% 2.26%         0.052	VALCO/ROCKY	′ MOUNT	AIN/CAS	S PIT:						
NON NCAT-6 NON NCAT-7         99.51% 99.76%         73.90% 75.41%         59.11% 61.56%         43.30% 45.86%         33.20% 36.79%         24.21% 27.68%         10.84% 12.58%         4.49% 5.29%         2.54% 3.03%           MON NCAT-8 NON NCAT-8         100.00%         72.81%         60.13%         44.37%         35.00%         25.71%         11.43%         4.61%         2.56%           MEAN STD DEV         99.82% 0.2%         74.45% 1.3%         60.62% 1.3%         44.71% 1.2%         35.13% 1.2%         26.02% 1.5%         11.73% 0.8%         4.85% 0.4%         2.73% 0.4%           EXPERIMENTAL           NCAT-1 NCAT-2         99.62% 99.62%         72.94% 60.56%         60.56% 45.85%         36.40% 27.19%         24.23% 11.29%         11.29% 4.86%         4.86% 2.75% 0.66%         2.75% 0.34%         44.62% 44.62%         34.36% 25.03%         25.03% 11.39%         11.39% 4.81%         2.75% 0.68%         27.59% 0.03%         4.81% 2.13%         2.75% 5.10%         2.80%           MEAN STD DEV         99.79% 0.2%         74.15% 2.3%         61.42% 2.2%         45.51% 2.0%         35.18% 25.81%         25.81% 11.86%         5.01% 5.00%         2.77% 0.09%         0.09% 0.09%         0.09% 0.09%         0.09% 0.09%         0.09% 0.09%         0.09% 0.09% 0.09%         0.09% 0.09% 0.09%         0.1306% 0.1604%         0.06% 0.29% 0	VALCO/ROCKY CONTROL				#8	#16	#30	#50	<b>#1</b> 00 :	#200
NON NCAT-7 NON NCAT-8 100.00% 72.81% 60.13% 44.37% 35.00% 25.71% 11.43% 4.61% 2.56%  MEAN STD DEV 0.2% 1.3% 1.2% 1.1% 1.5% 1.5% 1.5% 0.8% 0.4% 0.2%  EXPERIMENTAL  NCAT-1 100.00% 71.69% 60.00% 43.43% 33.15% 26.02% 11.73% 4.85% 2.73% NCAT-2 99.62% 72.94% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.29% 60.34% 44.62% 34.36% 25.03% 11.39% 4.86% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 11.39% 4.86% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80%  MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.09%  MEAN DIFF -0.0258% -0.24% -0.3823 -0.1842 0.5468 0.5747 0.0363 -0.1551 0.1918 0.5621 0.4266	VALCO/ROCKY	1/2	3/8	#4						
NON NCAT-8         100.00%         72.81%         60.13%         44.37%         35.00%         25.71%         11.43%         4.61%         2.56%           MEAN         99.82%         74.45%         60.62%         44.71%         35.13%         26.02%         11.73%         4.85%         2.73%           STD DEV         0.2%         1.3%         1.2%         1.1%         1.5%         1.5%         0.8%         0.4%         0.2%           EXPERIMENTAL           NCAT-1         100.00%         71.69%         60.00%         43.43%         33.15%         24.23%         11.29%         4.86%         2.75%           NCAT-2         99.62%         72.94%         60.56%         45.85%         36.40%         27.19%         12.62%         5.26%           NCAT-3         99.55%         75.29%         60.34%         44.62%         34.36%         25.03%         11.39%         4.81%         2.75%           NCAT-4         100.00%         76.69%         64.77%         48.14%         36.83%         26.80%         12.13%         5.10%         2.80%           MEAN         99.79%         74.15%         61.42%         45.51%         35.18%         25.81%         11.86%         5.01%<	VALCO/ROCKY CONTROL NON NCAT-5	1/2 100.00%	3/8 75.67%	# <b>4</b> 61.68%	45.32%	35.54%	26.49%	12.05%	5.00%	2.78%
EXPERIMENTAL           NCAT-1         100.00%         71.69%         60.00%         43.43%         33.15%         24.23%         11.29%         4.86%         2.75%           NCAT-2         99.62%         72.94%         60.56%         45.85%         36.40%         27.19%         12.62%         5.26%           NCAT-3         99.55%         75.29%         60.34%         44.62%         34.36%         25.03%         11.39%         4.81%         2.75%           NCAT-4         100.00%         76.69%         64.77%         48.14%         36.83%         26.80%         12.13%         5.10%         2.80%           MEAN         99.79%         74.15%         61.42%         45.51%         35.18%         25.81%         11.86%         5.01%         2.77%           STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL NON NCAT-5 NON NCAT-6	1/2 100.00% 99.51%	3/8 75.67% 73.90%	#4 61.68% 59.11%	45.32% 43.30%	35.54% 33.20%	26.49% 24.21%	12.05% 10.84%	5.00% 4.49%	2.78% 2.54%
EXPERIMENTAL  NCAT-1 100.00% 71.69% 60.00% 43.43% 33.15% 24.23% 11.29% 4.86% 2.75% NCAT-2 99.62% 72.94% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.29% 60.34% 44.62% 34.36% 25.03% 11.39% 4.81% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80% MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.0% MEAN DIFF -0.0258% ************************************	VALCO/ROCKY CONTROL NON NCAT-5 NON NCAT-6 NON NCAT-7	1/2 100.00% 99.51% 99.76%	3/8 75.67% 73.90% 75.41%	#4 61.68% 59.11% 61.56%	45.32% 43.30% 45.86%	35.54% 33.20% 36.79%	26.49% 24.21% 27.68%	12.05% 10.84% 12.58%	5.00% 4.49% 5.29%	2.78% 2.54% 3.03%
EXPERIMENTAL  NCAT-1 100.00% 71.69% 60.00% 43.43% 33.15% 24.23% 11.29% 4.86% 2.75% NCAT-2 99.62% 72.94% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.29% 60.34% 44.62% 34.36% 25.03% 11.39% 4.81% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80% MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.0% MEAN DIFF -0.0258% ************************************	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8	1/2 100.00% 99.51% 99.76% 100.00%	3/8 75.67% 73.90% 75.41% 72.81%	#4 61.68% 59.11% 61.56% 60.13%	45.32% 43.30% 45.86% 44.37%	35.54% 33.20% 36.79% 35.00%	26.49% 24.21% 27.68% 25.71%	12.05% 10.84% 12.58% 11.43%	5.00% 4.49% 5.29% 4.61%	2.78% 2.54% 3.03% 2.56%
NCAT-1 100.00% 71.69% 60.00% 43.43% 33.15% 24.23% 11.29% 4.86% 2.75% NCAT-2 99.62% 72.94% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.29% 60.34% 44.62% 34.36% 25.03% 11.39% 4.81% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80% MEAN 99.79% 74.15% 61.42% 45.51% 35.18% 25.81% 11.86% 5.01% 2.77% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.0% MEAN DIFF -0.0258% ************************************	VALCO/ROCKY CONTROL NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8	1/2 100.00% 99.51% 99.76% 100.00%	3/8 75.67% 73.90% 75.41% 72.81%	#4 61.68% 59.11% 61.56% 60.13%	45.32% 43.30% 45.86% 44.37% 44.71%	35.54% 33.20% 36.79% 35.00%	26.49% 24.21% 27.68% 25.71% 26.02%	12.05% 10.84% 12.58% 11.43%	5.00% 4.49% 5.29% 4.61% 4.85%	2.78% 2.54% 3.03% 2.56% 2.73%
NCAT-1 100.00% 71.69% 60.00% 43.43% 33.15% 24.23% 11.29% 4.86% 2.75% NCAT-2 99.62% 72.94% 60.56% 45.85% 36.40% 27.19% 12.62% 5.26% NCAT-3 99.55% 75.29% 60.34% 44.62% 34.36% 25.03% 11.39% 4.81% 2.75% NCAT-4 100.00% 76.69% 64.77% 48.14% 36.83% 26.80% 12.13% 5.10% 2.80% STD DEV 0.2% 2.3% 2.2% 2.0% 1.7% 1.4% 0.6% 0.2% 0.0% MEAN DIFF -0.0258% 1.62% 1.46% 1.39% 1.45% 1.35% 0.68% 0.29% 0.08% Mean DIFF + 3.18 0.19% 4.86% 5.43% 5.23% 4.67% 4.10% 2.30% 1.07% 0.30% Mean DIFF - 3.18; -0.24% -5.46% -3.84% -3.63% -4.57% -4.52% -2.04% -0.75% -0.23% t -0.3823 -0.1842 0.5468 0.5747 0.0363 -0.1551 0.1918 0.5621 0.4266	VALCO/ROCKY CONTROL NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8 MEAN	1/2 100.00% 99.51% 99.76% 100.00%	3/8 75.67% 73.90% 75.41% 72.81%	#4 61.68% 59.11% 61.56% 60.13%	45.32% 43.30% 45.86% 44.37% 44.71%	35.54% 33.20% 36.79% 35.00%	26.49% 24.21% 27.68% 25.71% 26.02%	12.05% 10.84% 12.58% 11.43%	5.00% 4.49% 5.29% 4.61% 4.85%	2.78% 2.54% 3.03% 2.56% 2.73%
NCAT-2         99.62%         72.94%         60.56%         45.85%         36.40%         27.19%         12.62%         5.26%           NCAT-3         99.55%         75.29%         60.34%         44.62%         34.36%         25.03%         11.39%         4.81%         2.75%           NCAT-4         100.00%         76.69%         64.77%         48.14%         36.83%         26.80%         12.13%         5.10%         2.80%           MEAN         99.79%         74.15%         61.42%         45.51%         35.18%         25.81%         11.86%         5.01%         2.77%           STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8 MEAN	1/2 100.00% 99.51% 99.76% 100.00%	3/8 75.67% 73.90% 75.41% 72.81%	#4 61.68% 59.11% 61.56% 60.13%	45.32% 43.30% 45.86% 44.37% 44.71%	35.54% 33.20% 36.79% 35.00%	26.49% 24.21% 27.68% 25.71% 26.02%	12.05% 10.84% 12.58% 11.43%	5.00% 4.49% 5.29% 4.61% 4.85%	2.78% 2.54% 3.03% 2.56% 2.73%
NCAT-2         99.62%         72.94%         60.56%         45.85%         36.40%         27.19%         12.62%         5.26%           NCAT-3         99.55%         75.29%         60.34%         44.62%         34.36%         25.03%         11.39%         4.81%         2.75%           NCAT-4         100.00%         76.69%         64.77%         48.14%         36.83%         26.80%         12.13%         5.10%         2.80%           MEAN         99.79%         74.15%         61.42%         45.51%         35.18%         25.81%         11.86%         5.01%         2.77%           STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8 MEAN STD DEV	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2%	3/8 75.67% 73.90% 75.41% 72.81%	#4 61.68% 59.11% 61.56% 60.13%	45.32% 43.30% 45.86% 44.37% 44.71%	35.54% 33.20% 36.79% 35.00%	26.49% 24.21% 27.68% 25.71% 26.02%	12.05% 10.84% 12.58% 11.43%	5.00% 4.49% 5.29% 4.61% 4.85%	2.78% 2.54% 3.03% 2.56% 2.73%
NCAT-3         99.55%         75.29%         60.34%         44.62%         34.36%         25.03%         11.39%         4.81%         2.75%           NCAT-4         100.00%         76.69%         64.77%         48.14%         36.83%         26.80%         12.13%         5.10%         2.80%           MEAN         99.79%         74.15%         61.42%         45.51%         35.18%         25.81%         11.86%         5.01%         2.77%           STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2%	3/8 75.67% 73.90% 75.41% 72.81% 74.45% 1.3%	#4 61.68% 59.11% 61.56% 60.13% 60.62% 1.2%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2%
NCAT-4         100.00%         76.69%         64.77%         48.14%         36.83%         26.80%         12.13%         5.10%         2.80%           MEAN         99.79%         74.15%         61.42%         45.51%         35.18%         25.81%         11.86%         5.01%         2.77%           STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2%	3/8 75.67% 73.90% 75.41% 72.81% 74.45% 1.3%	#4 61.68% 59.11% 61.56% 60.13% 60.62% 1.2%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2%
MEAN         99.79%         74.15%         61.42%         45.51%         35.18%         25.81%         11.86%         5.01%         2.77%           STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2%	3/8 75.67% 73.90% 75.41% 72.81% 74.45% 1.3% 71.69% 72.94%	#4 61.68% 59.11% 61.56% 60.13% 60.62% 1.2% 60.00% 60.56%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2%
STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% L 100.00% 99.62% 99.55%	3/8 75.67% 73.90% 75.41% 72.81% 74.45% 1.3% 71.69% 72.94% 75.29%	#4 61.68% 59.11% 61.56% 60.13% 60.62% 1.2% 60.00% 60.56% 60.34%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2% 2.75%
STD DEV         0.2%         2.3%         2.2%         2.0%         1.7%         1.4%         0.6%         0.2%         0.0%           MEAN DIFF         -0.0258%         ************************************	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% L 100.00% 99.62% 99.55%	3/8 75.67% 73.90% 75.41% 72.81% 74.45% 1.3% 71.69% 72.94% 75.29%	#4 61.68% 59.11% 61.56% 60.13% 60.62% 1.2% 60.00% 60.56% 60.34%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2% 2.75%
s sub D bar     0.07%     1.62%     1.46%     1.39%     1.45%     1.35%     0.68%     0.29%     0.08%       Mean DIFF + 3.18     0.19%     4.86%     5.43%     5.23%     4.67%     4.10%     2.30%     1.07%     0.30%       Mean DIFF - 3.181     -0.24%     -5.46%     -3.84%     -3.63%     -4.57%     -4.52%     -2.04%     -0.75%     -0.23%       t     -0.3823     -0.1842     0.5468     0.5747     0.0363     -0.1551     0.1918     0.5621     0.4266	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% L 100.00% 99.62% 99.55% 100.00%	3/8 75.67% 73.90% 75.41% 72.81% 74.45% 1.3% 71.69% 72.94% 75.29% 76.69%	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81% 5.10%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2% 2.75% 2.75% 2.80%
s sub D bar     0.07%     1.62%     1.46%     1.39%     1.45%     1.35%     0.68%     0.29%     0.08%       Mean DIFF + 3.18     0.19%     4.86%     5.43%     5.23%     4.67%     4.10%     2.30%     1.07%     0.30%       Mean DIFF - 3.181     -0.24%     -5.46%     -3.84%     -3.63%     -4.57%     -4.52%     -2.04%     -0.75%     -0.23%       t     -0.3823     -0.1842     0.5468     0.5747     0.0363     -0.1551     0.1918     0.5621     0.4266	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4  MEAN	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% 1.100.00% 99.62% 99.55% 100.00% 99.79%	3/8 75.67% 73.90% 75.41% 72.81% 74.45% 1.3% 71.69% 72.94% 75.29% 76.69%	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%  61.42%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83% 35.18%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81% 5.10%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2% 2.75% 2.75% 2.80%
Mean DIFF + 3.18       0.19%       4.86%       5.43%       5.23%       4.67%       4.10%       2.30%       1.07%       0.30%         Mean DIFF - 3.181       -0.24%       -5.46%       -3.84%       -3.63%       -4.57%       -4.52%       -2.04%       -0.75%       -0.23%         t       -0.3823       -0.1842       0.5468       0.5747       0.0363       -0.1551       0.1918       0.5621       0.4266	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4  MEAN STD DEV	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% 1. 100.00% 99.62% 99.55% 100.00% 99.79% 0.2%	3/8 75.67% 73.90% 75.41% 72.81%  74.45% 1.3%  71.69% 72.94% 75.29% 76.69%  74.15% 2.3%	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%  61.42% 2.2%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14% 45.51% 2.0%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83% 35.18% 1.7%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80% 25.81% 1.4%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13% 11.86% 0.6%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81% 5.10% 5.01% 0.2%	2.78% 2.54% 3.03% 2.56% 2.73% 0.2%  2.75% 2.75% 2.80% 0.0%
Mean DIFF - 3.181     -0.24%     -5.46%     -3.84%     -3.63%     -4.57%     -4.52%     -2.04%     -0.75%     -0.23%       t     -0.3823     -0.1842     0.5468     0.5747     0.0363     -0.1551     0.1918     0.5621     0.4266	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4  MEAN STD DEV  MEAN STD DEV	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% L 100.00% 99.62% 99.55% 100.00% 99.79% 0.2% -0.0258%	3/8 75.67% 73.90% 75.41% 72.81%  74.45% 1.3%  71.69% 72.94% 75.29% 76.69%  74.15% 2.3%	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%  61.42% 2.2%  0.7965%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14% 45.51% 2.0% 0.7997%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83% 35.18% 1.7% 0.0527%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80% 25.81% 1.4%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13% 11.86% 0.6% 0.1306%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81% 5.10% 5.01% 0.2% 0.1604%	2.78% 2.54% 3.03% 2.56%  2.73% 0.2%  2.75% 2.75% 2.80%  0.0%  0.0356%
t -0.3823 -0.1842 0.5468 0.5747 0.0363 -0.1551 0.1918 0.5621 0.4266	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4  MEAN STD DEV  MEAN STD DEV  MEAN DIFF s sub D bar	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% 1. 100.00% 99.62% 99.55% 100.00% 99.79% 0.2% -0.0258% 0.07%	3/8 75.67% 73.90% 75.41% 72.81%  74.45% 1.3%  71.69% 72.94% 75.29% 76.69%  74.15% 2.3%	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%  61.42% 2.2%  0.7965% 1.46%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14% 45.51% 2.0% 0.7997% 1.39%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83% 35.18% 1.7% 0.0527% 1.45%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80% 25.81% 1.4% -0.2101% 1.35%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13% 11.86% 0.6% 0.1306% 0.68%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81% 5.10% 5.01% 0.2% 0.1604% 0.29%	2.78% 2.54% 3.03% 2.56%  2.73% 0.2%  2.75% 2.75% 2.80%  0.0%  0.0356% 0.08%
	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4  MEAN STD DEV  MEAN STD DEV  MEAN STD DEV  MEAN DIFF s sub D bar Mean DIFF + 3.18	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% 1. 100.00% 99.62% 99.55% 100.00% 99.79% 0.2% -0.0258% 0.07% 0.19%	3/8 75.67% 73.90% 75.41% 72.81%  74.45% 1.3%  71.69% 72.94% 75.29% 76.69%  74.15% 2.3%  ***********************************	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%  61.42% 2.2%  0.7965% 1.46% 5.43%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14% 45.51% 2.0% 0.7997% 1.39% 5.23%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83% 35.18% 1.7% 0.0527% 1.45% 4.67%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80% 25.81% 1.4% -0.2101% 4.35% 4.10%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13% 11.86% 0.6% 0.6% 0.68% 2.30%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 5.26% 4.81% 5.10% 5.01% 0.2% 0.1604% 0.29% 1.07%	2.78% 2.54% 3.03% 2.56%  2.73% 0.2%  2.75% 2.75% 2.80%  0.0%  0.0356% 0.08% 0.30%
t critical two-tail 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824 3.1824	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4  MEAN STD DEV  MEAN STD DEV  MEAN DIFF s sub D bar Mean DIFF + 3.18	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% 1. 100.00% 99.62% 99.55% 100.00% 99.79% 0.2% -0.0258% 0.07% 0.19% -0.24%	3/8 75.67% 73.90% 75.41% 72.81%  74.45% 1.3%  71.69% 72.94% 75.29% 76.69%  74.15% 2.3%  ************ 1.62% 4.86% -5.46%	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%  61.42% 2.2%  0.7965% 1.46% 5.43% -3.84%	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14% 2.0% 0.7997% 1.39% 5.23% -3.63%	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83% 35.18% 1.7% 0.0527% 1.45% 4.67% -4.57%	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80% 25.81% 1.4% -0.2101% 1.35% 4.10% -4.52%	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13% 11.86% 0.6% 0.68% 2.30% -2.04%	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 5.26% 4.81% 5.10% 5.01% 0.2% 0.1604% 0.29% 1.07%	2.78% 2.54% 3.03% 2.56%  2.73% 0.2%  2.75% 2.75% 2.80%  0.0356% 0.08% 0.30% -0.23%
	VALCO/ROCKY CONTROL  NON NCAT-5 NON NCAT-6 NON NCAT-7 NON NCAT-8  MEAN STD DEV  EXPERIMENTA  NCAT-1 NCAT-2 NCAT-3 NCAT-4  MEAN STD DEV  MEAN DIFF s sub D bar Mean DIFF + 3.18 Mean DIFF - 3.18;	1/2 100.00% 99.51% 99.76% 100.00% 99.82% 0.2% L 100.00% 99.62% 99.55% 100.00% 99.79% 0.2% -0.0258% 0.07% 0.19% -0.24% -0.3823	3/8 75.67% 73.90% 75.41% 72.81%  74.45% 1.3%  71.69% 72.94% 75.29% 76.69%  74.15% 2.3%  4.86% -5.46% -0.1842	#4 61.68% 59.11% 61.56% 60.13%  60.62% 1.2%  60.00% 60.56% 60.34% 64.77%  61.42% 2.2%  0.7965% 1.46% 5.43% -3.84% 0.5468	45.32% 43.30% 45.86% 44.37% 44.71% 1.1% 43.43% 45.85% 44.62% 48.14% 45.51% 2.0% 0.7997% 1.39% 5.23% -3.63% 0.5747	35.54% 33.20% 36.79% 35.00% 35.13% 1.5% 33.15% 36.40% 34.36% 36.83% 35.18% 1.7% 0.0527% 1.45% 4.67% -4.57% 0.0363	26.49% 24.21% 27.68% 25.71% 26.02% 1.5% 24.23% 27.19% 25.03% 26.80% 25.81% 1.4% -0.2101% 1.35% 4.10% -4.52% -0.1551	12.05% 10.84% 12.58% 11.43% 11.73% 0.8% 11.29% 12.62% 11.39% 12.13% 11.86% 0.6% 0.68% 2.30% -2.04% 0.1918	5.00% 4.49% 5.29% 4.61% 4.85% 0.4% 4.86% 5.26% 4.81% 5.10% 5.01% 0.2% 0.1604% 0.29% 1.07% -0.75% 0.5621	2.78% 2.54% 3.03% 2.56%  2.73% 0.2%  2.75% 2.75% 2.80%  0.0356% 0.08% 0.30% -0.23% 0.4266

# **Irwin Winsor/Stute Pit:**

CO	N I	T	D	$\boldsymbol{\cap}$	•
uu	IV		К	u	L

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	
NON NCAT-5	100.00%	80.67%	59.97%	43.01%	31.60%	22.14%	13.88%	8.29%	4.99%	
NON NCAT-6	99.70%	81.64%	60.27%	44.14%	31.81%	22.03%	13.90%	8.57%	5.49%	
NON NCAT-7	100.00%	75.87%	56.65%	42.17%	30.19%	20.18%	12.33%	7.46%	4.67%	
NON NCAT-8	99.40%	80.37%	60.86%	44.82%	33.32%	23.51%	14.71%	8.82%	5.34%	
Mean	99.78%		59.43%	43.54%	31.73%	21.96%	13.71%	8.29%	5.12%	
STD DEV	0.3%	2.6%	1.9%	1.2%	1.3%	1.4%	1.0%	0.6%	0.4%	
EXPERIMENTAL										
NCAT-1	99.78%	79.98%	58.65%	44.50%	33.76%	24.42%	15.79%	9.73%	6.10%	
NCAT-2	99.45%	82.21%	60.11%	42.64%	30.06%	20.80%	13.37%	8.47%	5.59%	
NCAT-3	100.00%	78.89%	58.50%	42.87%	31.01%	21.76%	14.02%	8.76%	5.59%	
NCAT-4	100.00%	79.60%	60.78%	45.63%	33.53%	23.71%	15.34%	9.66%	6.25%	
						•				
Mean	99.81%	80.17%	59.51%	43.91%	32.09%	22.67%	14.63%	9.16%	5.88%	
STD DEV	0.3%	1.4%	1.1%	1.4%	1.8%	1.7%	1.1%	0.6%	0.3%	
MEAN DIFF	0.00000/	0.50040/	0.07400/	0.27600/	0.25770/	0.70000/	0.00070/	0.07040/	0.75770/	
		0.5331%	0.0742%	0.3760%	0.3577%	0.7092%	0.9207%	0.8704%	0.7577%	
s sub D bar	0.20%	0.9%	0.7%	0.6%	0.8%	0.8%	0.6%	0.3%	0.2%	
Mean DIFF + 3.18		3.34%	2.17%	2.44%	2.94%	3.18%	2.70%	1.98%	1.47%	
Mean DIFF - 3.182		-2.28%	-2.02%	-1.69%	-2.23%	-1.76%	-0.86%	-0.24%	0.05%	
t	0.1509	0.6041	0.1129	0.5791	0.4401	0.9133	1.646	2.5009	3.4088	
t critical two- tail	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824	

# MONK PIT:

# **EXPERIMENTAL**

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	99.47%	82.21%	62.56%	38.03%	25.14%	17.44%	11.11%	6.52%	3.17%
NCAT-2	98.53%	83.61%	65.02%	42.68%	30.80%	22.54%	14.76%	9.57%	7.91%
NCAT-3	99.16%	81.68%	64.78%	43.70%	31.90%	23.41%	14.84%	7.91%	3.14%
NCAT-4	100.00%	80.47%	64.06%	42.26%	29.88%	21.37%	13.44%	7.38%	3.15%
MEAN STD DEV	99.29% 0.6%	81.99% 1.3%	64.10% 1.1%	41.67% 2.5%	29.43% 3.0%	21.19% 2.6%	13.53% 1.7%	7.85% 1.3%	4.34% 2.4%

# **CONTROL**

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NON NCAT-5	99.50%	80.09%	62.74%	41.40%	28.90%	20.54%	13.15%	7.66%	3.72%
NON NCAT-6	99.24%	78.83%	63.42%	43.15%	31.60%	23.12%	14.77%	8.27%	3.63%

<b>NON NCAT-7</b>	98.59%	82.73%	66.32%	42.41%	28.37%	19.66%	12.50%	7.28%	3.55%
NON NCAT-8	99.50%	79.58%	63.54%	42.81%	30.48%	21.81%	13.73%		3.23%
							· · · · · · · · · · · · · · · · · · ·		
MEAN	99.21%	80.31%	64.01%	42.44%	29.84%	21.28%	13.54%	7.72%	3.53%
STD DEV	0.4%	1.7%	1.6%	0.8%	1.5%	1.5%	1.0%	0.4%	0.2%
MEAN DIFF	0.08%	1.68%	0.10%	-0.77%	-0.41%	-0.10%	-0.00%	0.13%	0.81%
s sub D bar	0.30%	1.22%	0.66%	0.96%	1.50%	1.42%	0.90%	0.53%	1.16%
Mean DIFF + 3.18	1.03%	5.57%	2.19%	2.29%	4.36%	4.42%	2.86%	1.83%	4.49%
Mean DIFF - 3.18;	-0.86%	-2.20%	-2.00%	-3.84%	-5.17%	-4.62%	-2.87%	-1.57%	-2.88%
t	0.2835	1.3797	0.1465	-0.8018	-0.2719	-0.0694		0.2444	0.6962
P(T<=t) two-tail	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824	3.1824
PAGOSA TROU	<b>JT LAKE</b>	S							
CONTROL									
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
Non NCAT-1	99.74%	73.50%	46.45%	33.26%	22.75%	16.09%	11.09%	7.57%	5.33%
Non NCAT-2	99.80%	76.99%	54.75%	41.27%	29.60%	21.25%	14.52%	9.64%	6.63%
Non NCAT-3	99.46%	72.27%	47.95%	32.01%	22.27%	15.76%	10.59%	6.97%	4.74%
Non NCAT-7	99.79%	79.37%	56.00%	38.61%	27.73%	20.00%	13.62%	8.91%	6.34%
Non NCAT-8	100.00%	75.03%	50.12%	34.20%	24.37%	17.49%	11.94%	7.99%	5.64%
							11.0170	1.0070	0.0470
MEAN	99.76%	75.43%	51.05%	35.87%	25.34%	18.12%	12.35%	8.22%	5.74%
STD DEV	0.2%	2.8%	4.2%	3.9%	3.2%	2.4%	1.7%	1.1%	0.8%
									2.270
<b>EXPERIMENTA</b>	L								
NCAT-4	100.00%	76.34%	52.40%	35.85%	25.35%	18.28%	12.53%	8.36%	5.83%
NCAT-5	100.00%	74.63%	50.46%	37.59%	27.07%	19.71%	13.81%	9.44%	6.61%
NCAT-6	100.00%	75.65%	51.00%	36.76%	25.63%	18.29%	12.65%	8.59%	5.94%
								· · · · · · · · · · · · · · · · · · ·	
MEAN	100.00%	0.75538	0.51287	0.367354	0.260173	0.1876162	0.129988	0.087975	0.061266
STD DEV	0.0%	0.9%	1.0%	0.9%	0.9%	0.8%	0.7%	0.6%	0.4%
	0.0.0	0.070	1.070	0.0.0	0.070	0.070	0.770	0.070	<b>∪.</b> ¬ /∪
MEAN DIFF			0.2332%	0.8630%		0.6446%		0.5799%	0.470

S sub d bar = Sample std./ sqrt (n)

S sub d bar = mean diff./ t

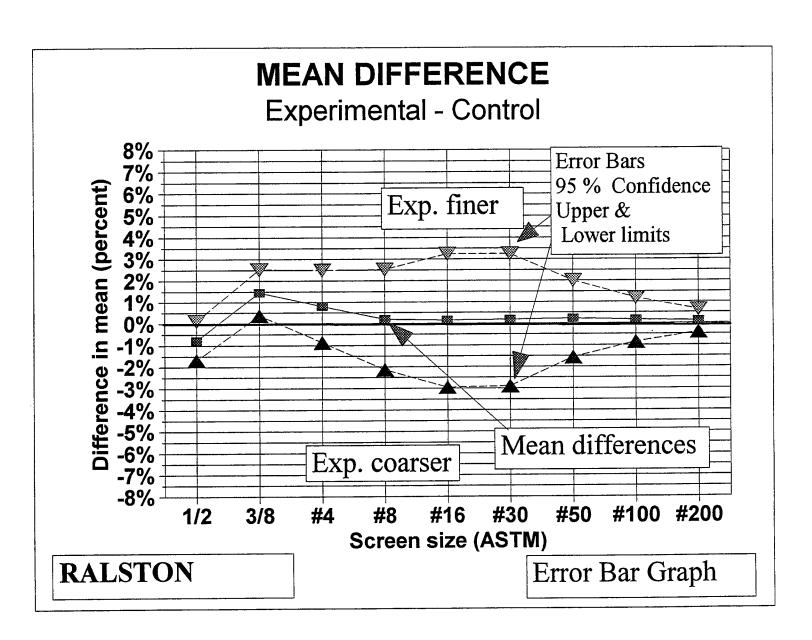
t = mean diff./ S sub d bar

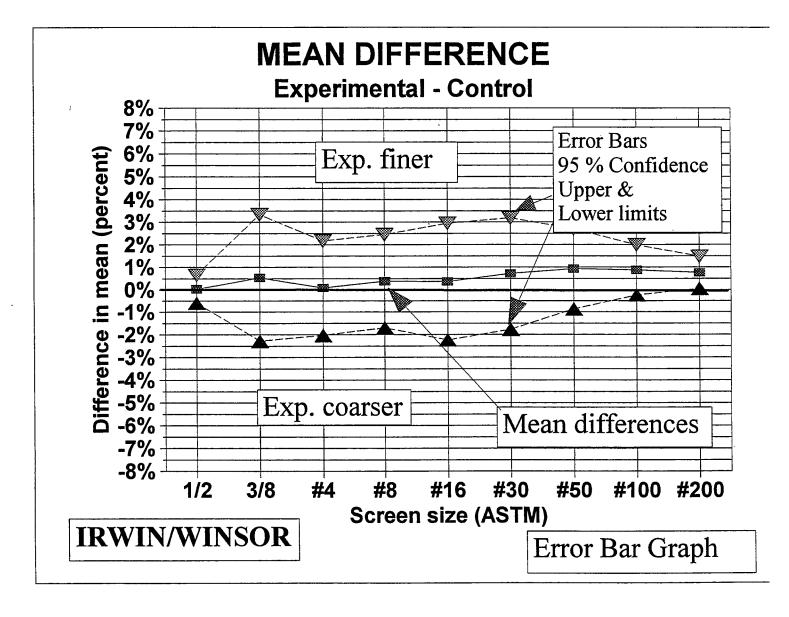
95 % Confidence limits = Mean diff. +/- 3.1824 \* S sub d bar

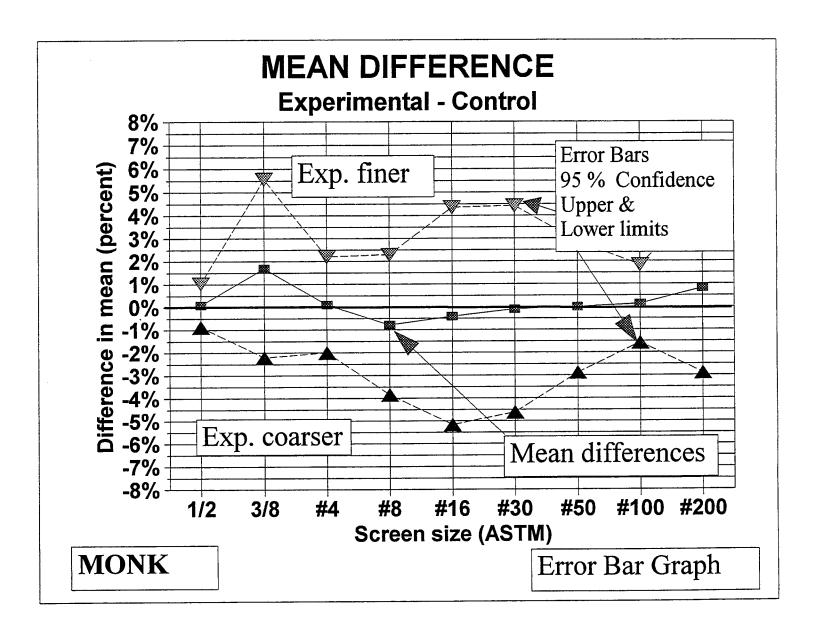
n = 4, # of differences

# APPENDIX B

- \* Confidence Interval Figures For Each Aggregate Source
  - \* Data Used to Calculate the 95 % Confidence Intervals
    - \* Data From the Students t-Test
    - \* Gradation Results From Each Aggregate Source

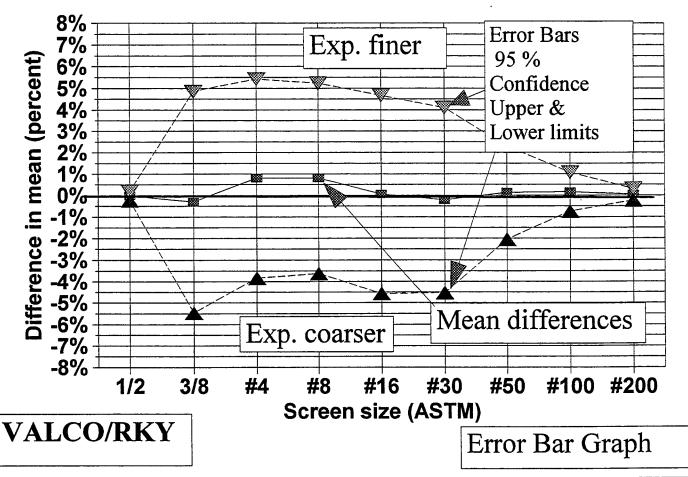








# **Experimental - Control**



#### Page: D - 1

## **FRANCISCOTTI**

## 1/2 SIEVE

## t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.996571615532207	0.998279004593418
Variance	7.01361800214759E-06	
Observations	4	4
Pearson Correlation	-0.162551179281695	7
Pooled Variance	5.6318457846044E-06	
Hypothesized Mean Difference	0	
ď	3	
t	-0.94568411494538	
P(T<=t) one-tail	0.207038447871417	
t Critical one-tail	2.3533634343976	
P(T<=t) two-tail	0.414076895742834	
t Critical two-tail	3.18244630501062	

#### 3/8 SIEVE

## t-Test Paired Two-Sample for Means

Control and the control to work		
	Variable 1	Variable 2
Mean	0.705212855172953	0.696401229010712
Variance	6.30737551868694F-05	
Observations	4	4
Pearson Correlation	-0.643644645092493	•
Pooled Variance	0.000142379095902616	
Hypothesized Mean Difference	9	
ď	3	
t	0.843056745071967	
P(T⊂t) one-tall	0.230552844460898	
t Critical one-tail	2.3533634343976	
P(T<=t) two-tail	0.461105688921795	
t Critical two-tail	3.18244630501062	

#### 84

## t-Test Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.458362137793419	0.44668143058799
Variance	3.526206513365025-06	0.00043060127318459
Observations	4	4
Peerson Correlation	-0.321795041909436	~
Pooled Variance	0.000232931669159104	
Hypothesized Mean Difference	0	
ď	3	
t	1,00053848674475	
P(T<≃t) one-talf	0.195389806274356	
t Critical one-tail	2.3533634343976	
P(To=t) two-tail	0.390779616548712	
t Critical two-tail	3.18244630501062	

#### **#**

#### t-Test Paired Two-Sample for Means

Frest Pared Two-Sample for Means		
	Variable 1	Variable 2
Mean	0.336057513064896	0.330680000615908
Variance	2.8573177522128E-05	
Observations	4	4
Peerson Correlation	0.870732286698803	~
Pooled Variance	0.000280527110619772	
Hypothesized Mean Difference	0	
ď	3	
t	0.577986260532656	
P(T⊂t) one-tail	0.301901347739717	
t Critical one-tail	2.3533634343976	
P(T⊂=t) two-tail	0.603802695479434	
t Critical two-tail	3.18244630501062	

#### #16

## t-Test Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.247896848247481	0.247149438820667
Variance	4.35655882272443E-05	
Observations	4	4
Pearson Correlation	0.898451619703346	7
Pooled Variance	0.000278315192363843	
Hypothesized Mean Difference	0	
ď	3	
t	0.0880856430137138	
P(T<=t) one-tail	0.467679587721309	
t Critical one-tail	2.3533634343976	
P(T<=t) two-tail	0.935359175442618	
t Critical two-tail	3.18244630501062	

#### **#30**

## t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.17361325	0.17308811
Variance		0.00034895
Observations	4	4
Pearson Correlation	0.66341098	-
Pooled Variance	0.00018987	
Hypothesized Mean Difference	0	
df	3	
t	0.06748688	
P(T<=t) one-tail	0.47522009	
t Critical one-tail	2.35336343	
P(T<=t) two-tail	0.95044019	
t Critical two-tail	3.18244631	

#### #50

# t-Test: Paired Two-Sample for Means

Variable 1	Variable 2
0.11317147	0.11158303
1.7116E-05	0.0001607
4	4
0.49479551	-
3	
0.28311106	
3.18244631	
	1.7116E-05 4 0.49478551 8.8909E-05 0 3 0.28311106 0.29731643 0.79550353

#### #100

## t-Test Paired Two-Sample for Means

	Variable 1 Variable 2
Moan	0.07295878 0.0709209
Variance	6.3456E-06 6.1129E-05
Observations	4 4
Pearson Correlation	0.54348712
Pooled Variance	3.3737E-05
Hypothesized Mean Difference	0
₫	3
t	0.60050419
P(T<=t) one-tait	0.2952529
t Critical one-tail	2.35336343
P(T⊂=t) two-tail	0.5905058
t Critical two-tail	3.18244631

## #200

## t-Test Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.04602038	0.04383227
Variance	3.3147E-06	2.1637E-05
Observations	4	4
Pearson Correlation	0.70093696	
Pooled Variance	1.2476E-05	
Hypothesized Mean Difference	0	
ď	3	
t	1.21006399	
P(T<=t) one-tail	0.15645147	
t Critical one-tail	2.35336343	
P(T<=t) two-tail	0.31290293	
t Critical two-tail	3.18244631	

Page: D - 2	1/2 SIEVE		RALSTON	t-Test: Paired Two-Sample for Means	# 16 SIEVE	
t-Test: Paired Two-Sample for Means				Trest. Force I wo comple for means	Variable 1	Variable 2
Mean	Variable 1	Variable 2 0.98954466	-	Mean	0.266844164264627	0 2653757 639500
Variance		0.98954466 3.346E-06		Variance	0.000219484107466921	0.000341605894113272
Observations	2.2395-05	3.346E-06		Observations	4	1100004113272
Pearson Correlation	-0.3474716	4		Pearson Correlation	0.331600138833067	4
Pooled Variance	1.294E-05			Pooled Variance	0.00028054500079011	
Hypothesized Mean Difference	1.2340-00			Hypothesized Mean Difference	Ó	
d'	3			ď	3	
<u>,                                     </u>	-2.759911			t	0.15075737952589	
P(To=t) one-tail	0.03507877			P(T<=t) one-tail	0.444866700356124	
t Critical one-tail	2.35336343			t Critical one-tail	2.3533634343976	
P(T<=t) two-tail	0.07015754			P(T<=t) two-tail	0.889733400712248	
t Critical two-tail	3.18244631			t Critical two-tail	3.18244630501062	
	3/8 SIEVE			A Tank Your County Assessed to the county	# 30 SIEVE	
t-Test: Paired Two-Sample for Means				t-Test Two Sample Assuming Equal Vi	viance Variable 1	Variable 2
Mean	Variable 1			Mean	0.169186751435183	0.167432700899705
Variance		0.79747499		Variance	0.000172927756376044	0.000198533563873232
Observations	0.00014316	0.00024654		Observations	4	4.000.0000000007.3232
Pearson Correlation	4	4		Pooled Variance	0.000185730660124635	•
	0.91539077			Hypothesized Mean Difference	0	
Pooled Variance	0.00019485			ď	e 0	
Hypothesized Mean Difference of	0			t	0.182018402418259	
•	3			P(T<≖t) one-tait	0.430781054561881	
P(T<=t) one-tail	4.25910261			t Critical one-tail	1.94318028004358	
t Critical one-tail	0.01186793			P(T<=t) two-tail	0.861562109123762	
P(T<=0) two-tall	2.35336343 0.02373587			t Critical two-tall	2.44691185086496	
t Critical two-tail	3.18244631					
	3.10244031					
1-Test: Paired Two-Sample for Means	#4 SIEVE			t-Test: Paired Two-Sample for Means	#50 SIEVE	
	Variable 1	Variable 2			Variable 1	Marketta a
Mean		0.65746052		Mean	0.0898567268253932	Variable 2 0.0876883207783596
Variance	0.00028672	0.00011771		Variance	7.5475181521397E-05	5.2074692428217E-05
Observations	4	4		Observations	4	5.2014032420217E-05
Peerson Correlation Pooled Variance	0.7959684			Pearson Correlation	0.0170905978089687	•
	0.00020222			Pooled Variance	6.3774936974808E-05	-
Hypothesized Mean Difference of	0			Hypothesized Mean Difference	0	•
-	3			ď	_	
	4 69769674			-	3	
PiTcath constall	1.53762578			Ţ	3 0.387266354760011	
	0.11087201			t P(T⊂=t) one-tail	3 0.387266354760011 0.362199404648422	
t Critical one-tait	0.11087201 2.35336343			t P(T-c=t) one-tail t Critical one-tail		
t Critical one-tall P(T<=t) two-tall	0.11087201 2.35336343 0.22174403			( P(T <= t) one-tail t Critical one-tail P(T <= t) two-tail	0.362199404648422 2.3533634343976 0.724398809296844	
P(T<) one-tail t Critical one-tail P(T<) two-tail t Critical two-tail	0.11087201 2.35336343			t P(T-c=t) one-tail t Critical one-tail	0.362199404648422 2.3533634343976	
t Critical one-tall P(T<=t) two-tall	0.11087201 2.35336343 0.22174403			t P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail t Critical two-tail	0.362199404648422 2.3533634343976 0.724398809296844	
t Critical one-tail P(T > 0) two-tail t Critical two-tail  8 8 SIEVE t-Test: Paired Two-Sample for Means	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1			( P(T <= t) one-tail t Critical one-tail P(T <= t) two-tail	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062	
t Critical one-tail P(T ← C) two-tail t Critical two-tail  8 8 SEEVE t-Test: Paired Two-Sample for Means  Mean	0.11087201 2.35336343 0.22174403 3.18244631			t P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail t Critical two-tail	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 \$100 \$IEVE Variable 1	Variable 2
t Critical one-tail P(T = 0 two-tail t Critical two-tail  8 8 StEVE t-Test: Paired Two-Sample for Means Mean Variance	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1	0.41417486		t P(T<=t) one-tall t Critical one-tall t Critical one-tall P(T<=t) two-tall t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 \$100 \$IEVE Variable 1 0.0501330266025405	0.0485190478493572
t Critical one-tail P(T = 0 two-tail t Critical two-tail # 8 StEVE t-Test: Paired Two-Sample for Means Mean Variance Observations	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474	0.41417486		( P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail  1-Test: Paired Two-Sample for Means  Mean	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 \$100 \$IEVE Variable 1	
t Critical one-tail P(T = 0) two-tail t Critical two-tail  # # # StEVE t-Test: Paired Two-Sample for Means  Mean Vertance Observations Peanson Correlation	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305	0.41417486		t P(T<=t) one-tall t Critical one-tall p(T<=t) two-tall t Critical two-tall t Critical two-tall t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 8100 SIEVE Variable 1 0.0501330266025405 2.5438105040976E-05	0.0485190478493572
1 Critical one-tail P(T > 0) two-tail 1 Critical two-tail 8 8 SIEVE 1-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951	0.41417486		t (Critical one-tail t Critical one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means  Mean  Variance Observations Pearson Correlation Pooled Variance	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 \$100 \$IEVE Variable 1 0.0501330266025405	0.0485190478493572
t Critical one-tail P(T-=0 two-tail t Critical two-tail  8 8 SIEVE t-Test: Paired Two-Sample for Means Mean Variance Observations Peanson Correlation Pooled Variance Hypothesized Mean Difference	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00025951	0.41417486		t P(T<=t) one-tall t Critical one-tall p(T<=t) two-tall t Critical two-tall t Critical two-tall t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 8100 SIEVE Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322	0.0485190478493572
t Critical one-tail P(T = 1) two-tail t Critical two-tail  # # # StEVE t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance thypothesized Mean Difference of	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0 3	0.41417486		t (Critical one-tail t Critical one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means  Mean  Variance Observations Pearson Correlation Pooled Variance	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 \$100 \$IEVE Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05	0.0485190478493572
t Critical one-tail P(T > 1) two-tail t Critical two-tail # 8 SIEVE t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference off t	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0 3 0.26402279	0.41417486		t (T<=t) one-tall t Critical one-tall t Critical one-tall p(T<=t) two-tall t Critical two-tall t Critical two-tall t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference of t	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 \$100 \$IEVE Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05	0.0485190478493572
t Critical one-tail P(T ← C) two-tail t Critical two-tail  # 8 SIEVE t-Test: Paired Two-Sample for Means  Mean Vertance Observations Peanson Correlation Pooled Variance Hypothesized Mean Difference of t P(T ← C) one-tail	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.00026951 0.0002697 0.40443023	0.41417486		t (Critical one-tail t Critical one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail to Critical two-tail training the Critical two-tail training tra	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 8100 SIEVE Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3	0.0485190478493572
t Critical one-tail P(T ← 1) two-tail t Critical two-tail  ### StEVE t-Test: Paired Two-Sample for Means  ###################################	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.26402279 0.40443023 2.35336343	0.41417486		t (Critical one-tail t Critical one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means  Mean  Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 8100 SIEVE Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925	0.0485190478493572
t Critical one-tail P(T ← 1) two-tail t Critical two-tail  # 8 SIEVE t-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		t Critical one-tail P(T<=t) one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail  t-Test: Paired Two-Sample for Means  Mean Variance Observations Peanson Correlation Pooled Variance Hypothesized Mean Difference of t P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  \$100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 0.509560059939925 0.322738791213532	0.0485190478493572
I Critical one-tail P(T = 0) two-tail I Critical two-tail I Critical two-tail I S & SIEVE I-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance I Pypothesized Mean Difference If I Critical one-tail I Critical one-tail P(T = 1) two-tail	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.26402279 0.40443023 2.35336343	0.41417486		t (Critical one-tail t Critical one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means  Mean  Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062 8100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322736791213532 2.3533634343976	0.0485190478493572
t Critical one-tail P(T ← 1) two-tail t Critical two-tail  # 8 SIEVE t-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		t Critical one-tail P(T<=t) one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail t Critical two-tail	0.362199404648422 2.3533634343976 0.724398905296844 3.18244630501062  8100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065	0.0485190478493572
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail P(T<=t) two-tail P(T<=t) two-tail P(T<=t) two-tail I-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df I Critical one-tail P(T<=t) one-tail I Critical two-tail I Critical two-tail	0.362199404648422 2.3533634343976 0.724398805296844 3.18244630501062  8100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062	0.0485190478493572
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T <= t) one-tall 1 Critical one-tall P(T <= t) two-tall P(T <= t) two-tall 1 Critical two-tail 1 Critical two-tail 1 Critical two-tail  1 Critical one-tail Parson Correlation Pooled Variance Hypothesized Mean Difference df 1 P(T <= t) one-tail 1 Critical one-tail P(T <= t) two-tail 1 Critical two-tail	0.362199404648422 2.3533634343976 0.724398805296844 3.18244630501062  8100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062	0.0485190478493572 1.1158010520335E-05 4
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail t Critical two-tail  t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail p(T<=t) two-tail t Critical two-tail t-Test: Paired Two-Sample for Means t-Test: Paired Two-Sample for Means Mean	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  \$100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4-0.104866731527322 1.8298057780655E-05 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  \$ 200 SIEVE  Variable 1 Variable 1	0.0485190478493572 1.1158010520335E-05 4 /artable 2 /artable 2
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		t Critical one-tail P(T<=t) one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail  t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail t Critical one-tail t Critical two-tail  t-Test: Paired Two-Sample for Means  ### Test: Paired Two-Sample for Means Mean Mean	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  8100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3.0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  8 200 SIEVE  Variable 1 Variable 1 Variable 1 0.0273632896500255	0.0485190478493572 1.1158010520335E-05 4 //arlable 2 //arlable 2 0.0261979987726052
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		P(T<=t) one-tail   P(T<=t) wo-tail   Critical one-tail   P(T<=t) two-tail   Critical one-tail   Critical one-tail   Critical two-tail	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  \$100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4-0.104866731527322 1.8298057780655E-05 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  \$ 200 SIEVE  Variable 1 Variable 1	0.0485190478493572 1.1158010520335E-05 4 /artable 2 /artable 2
t Critical one-tail P(T ← 1) two-tail t Critical two-tail  # 8 SIEVE t-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T <= t) one-tall 1 Critical one-tall P(T <= t) two-tall P(T <= t) two-tall 1 Critical two-tall 1 Critical two-tall 1 Critical two-tall 1 Critical one-tall Parison Pooled Variance Hypothesized Mean Difference df 1 P(T <= t) one-tall 1 Critical one-tall P(T <= t) two-tall 1 Critical one-tall 1 Critical one-tall P(T <= t) two-tall 1 Critical two-tall 1 Critical one-tall P(T <= t) two-tall 1 Critical two-tall 1 Critical two-tall 0 Critical two-tall	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  \$100 \$IEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 0.0509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  \$ 200 \$IEVE  Variable 1 Variable 1 Variable 1 0.0273632896500255 7.7899446355805E-06 4	0.0485190478493572 1.1158010520335E-05 4 //arlable 2 //arlable 2 0.0261979987726052
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail t Critical two-tail t Critical two-tail t Critical two-tail  t-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail t Critical one-tail t Critical two-tail t Critical two-tail  t-Test: Paired Two-Sample for Means t-Test: Paired Two-Sample for Means Mean Mean Variance Observations Pearson Correlation	0.362199404648422 2.3533634343976 0.724398909296844 3.18244630501062  \$100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  \$ 200 SIEVE  Variable 1 Variable 1 0.0773632896500255 7.7899446355805E-06 4 -0.02557034075969	0.0485190478493572 1.1158010520335E-05 4 //arlable 2 //arlable 2 0.0261979987726052
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail  I-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail t Critical one-tail t Critical two-tail  I-Test: Paired Two-Sample for Means I-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  \$100 \$IEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 0.0509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  \$ 200 \$IEVE  Variable 1 Variable 1 Variable 1 0.0273632896500255 7.7899446355805E-06 4	0.0485190478493572 1.1158010520335E-05 4 //arlable 2 //arlable 2 0.0261979987726052
t Critical one-tail P(T <= 0) two-tail t Critical two-tail  # 8 SIEVE I-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		t Critical one-tail t Critical one-tail t Critical one-tail t Critical one-tail t Critical two-tail t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means Peanson Correlation Pooled Variance Hypothesized Mean Difference df t t Critical one-tail t Critical two-tail t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means t-Test: Paired Two-Sample for Means t-Test: Paired Two-Sample for Means Mean Mean Mean Pearson Correlation Pooled Variance Hypothesized Mean Difference	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  8100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  8 200 SIEVE  Variable 1 Variable 1 0.0273632896500255 7.7899446355805E-06 4 -0.02557034075969 5.2548970757151E-06 6	0.0485190478493572 1.1158010520335E-05 4 //arlable 2 //arlable 2 0.0261979987726052
I Critical one-tail P(T = 0) two-tail I Critical two-tail I Critical two-tail I S & SIEVE I-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance I Pypothesized Mean Difference II I Critical one-tail I Critical one-tail P(T = 1) two-tail	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail P(T<=t) two-tail t Critical two-tail  I-Test: Paired Two-Sample for Means  Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference df t P(T<=t) one-tail t Critical one-tail t Critical one-tail t Critical two-tail  I-Test: Paired Two-Sample for Means I-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  \$100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 0 0.104866731527322 1.8298057780655E-05 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  \$ 200 SIEVE  Variable 1 0.0273632896500255 7.7899446355805E-06 4 0.02557034075969 5.2548970757151E-06 0 3	0.0485190478493572 1.1158010520335E-05 4 //arlable 2 //arlable 2 0.0261979987726052
I Critical one-tail P(T = 0) two-tail I Critical two-tail I Critical two-tail I S & SIEVE I-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance I Pypothesized Mean Difference II I Critical one-tail I Critical one-tail P(T = 1) two-tail	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail t Critical one-tail P(T<=t) two-tail t Critical two-tail t P(T<=t) one-tail t Critical one-tail t Critical two-tail t P(T<=t) Paired Two-Sample for Means t-Test: Paired Two-Sample for Means t-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference off t	0.362199404648422 2.3533634343976 0.724398909296844 3.18244630501062  \$100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  \$ 200 SIEVE  Variable 1 Variable 1 0.0273632896500255 7.7899446355805E-06 4 -0.02557034075969 5.2548970757151E-06 0 3 0.710979718642712	0.0485190478493572 1.1158010520335E-05 4 //arlable 2 //arlable 2 0.0261979987726052
t Critical one-tail P(T ← 1) two-tail t Critical two-tail  # 8 SIEVE t-Test: Paired Two-Sample for Means    Mean	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail I Critical one-tail P(T<=t) two-tail I Critical one-tail I Critical one-tail I Critical two-tail I Critical one-tail I Critical two-tail I Critical one-tail I Critical two-tail I Critical one-tail I Critical two-tail I Critical two-tail I Critical two-tail I Critical two-tail I Critical one-tail I Critica	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  8100 SIEVE  Vertable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  8 200 SIEVE  Variable 1 Variable 1 Variable 1 Variable 1 Variable 1 0.0273632896500255 7.7899446355805E-06 4 -0.02557034075969 5.2548970757151E-06 0 3 0.710979718642712 0.264194679803404	0.0485190478493572 1.1158010520335E-05 4 /arlable 2 /arlable 2 0.0261979987726052
t Critical one-tail P(T ⊂ ©) two-tail t Critical two-tail # 8 StEVE	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		t Critical one-tail t Critical two-tail t Critical two-tail t Critical two-tail t Critical one-tail t Critical one-tail t Critical two-tail t Critical one-tail	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  8100 SIEVE  Variable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  8 200 SIEVE  Variable 1 0.0273632896500255 7.7899446355805E-06 4 -0.02557034075969 5.2548970757151E-06 5.2548970757151E-06 0 3 0.710979718642712 0.264194679803404 2.3533634343976	0.0485190478493572 1.1158010520335E-05 4 /arlable 2 /arlable 2 0.0261979987726052
t Critical one-tail P(T ← 0) two-tail t Critical two-tail # 8 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	0.11087201 2.35336343 0.22174403 3.18244631 Variable 1 0.41610039 0.00021474 4 0.61819305 0.00026951 0.3 0.26402279 0.40443023 0.40443023 0.80886046	0.41417486		I P(T<=t) one-tail I Critical one-tail P(T<=t) two-tail I Critical one-tail I Critical one-tail I Critical two-tail I Critical one-tail I Critical two-tail I Critical one-tail I Critical two-tail I Critical one-tail I Critical two-tail I Critical two-tail I Critical two-tail I Critical two-tail I Critical one-tail I Critica	0.362199404648422 2.3533634343976 0.724398809296844 3.18244630501062  8100 SIEVE  Vertable 1 0.0501330266025405 2.5438105040976E-05 4 -0.104866731527322 1.8298057780655E-05 0 3 0.509560059939925 0.322738791213532 2.3533634343976 0.645477582427065 3.18244630501062  8 200 SIEVE  Variable 1 Variable 1 Variable 1 Variable 1 Variable 1 0.0273632896500255 7.7899446355805E-06 4 -0.02557034075969 5.2548970757151E-06 0 3 0.710979718642712 0.264194679803404	0.0485190478493572 1.1158010520335E-05 4 /arlable 2 /arlable 2 0.0261979987726052

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1/2 SIEVE t-Test: Paired Two-Sample for Means

## IRWIN/WINSOR/STUTE PIT

#16 SIEVE
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<u> </u>	Variable 1	Variable 2
Mean	0.9980638	0.9977661
Variance		8.148E-06
Observations	4	4
Pearson Correlation	-0.039627	•
Pooled Variance	7.485E-06	
Hypothesized Mean Difference	0	
ď	3	
t	0.1509246	
P(Tc=t) one-tall	0.4448061	
t Critical one-tail	2,3533634	
P(T<=t) two-tait	0.8896123	
t Critical two-tail	3 1824463	

## 3/8 SIEVE

1-Test: Paired Two-Sample for Means

	Variable 1	Variable 2
Meen	0.8017083	0.7963775
Variance		0.0006591
Observations	4	4
Pearson Correlation	0.7520273	•
Pooled Variance	0.0004317	
Hypothesized Mean Difference	0	
ď	3	
t	0.6041332	
P(T⊂t) one-tall	0.2941913	
t Critical one-tail	2.3533634	
P(To=t) two-tail	0.5883826	
t Critical two-tail	3.1824463	

## # 4 SIEVE t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2
Meen	0.5950921	0.5943496
Variance	0.0001241	0.0003589
Observations	4	4
Pearson Correlation	0.7347129	~
Pooled Variance	0.0002415	
Hypothesized Mean Difference	0	
ď	3	
t	0.1129463	
P(To=t) one-tail	0.4586035	
t Critical one-tall	2.3533634	
P(Tc=t) two-tail	0.9172071	
t Critical two-tail	3.1824463	

## #8 SIEVE

f-Test Paired Two-Samole for Mason

ever cared two-sample for Means		
	Variable 1	Variable 2
Mean	0.4391126	0.4353525
Variance		0.0001395
Observations	4	4
Pearson Correlation	0.510758	-
Pooled Variance	0.0001695	
Hypothesized Mean Difference	0	
ď	3	
t	0.5791473	
P(T<=t) one-tail	0.301556	
t Critical one-tail	2.3533634	
P(T<=t) two-tail	0 6031119	
t Critical two-tail	3.1824463	

rescratted two-sample for Means		
	Variable 1	Variable 2
Mean	0.3208848	0.3173074
Variance		0.0001634
Observations	4	4
Pearson Correlation	0.5068478	•
Pooled Variance	0.0002515	
Hypothesized Mean Difference	0	
ď	3	
t	0.4401451	
P(T⊂t) one-tail	0.3448067	
t Critical one-tail	2.3533634	
P(T<=t) two-tail	0.6896135	
t Critical two-tall	3.1824463	

## # 30 SIEVE

## t-Test: Paired Two-Sample for Means

	Variable 1 Variable 2
Mean	0.2267257 0.2196333
Variance	0.0002817 0.0001871
Observations	4 4
Pearson Correlation	0.4956221
Pooled Variance	0.0002344
Hypothesized Mean Difference	0
ď	3
t	0.9132575
P(Tc=t) one-tail	0.2142233
t Critical one-tall	2.3533634
P(Tc=t) two-tail	0.4284465
t Critical two-tail	3.1824463

## # 60 SIEVE

## t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2	
Mean	0.1462659	0.1370587	
Variance		9.905E-05	
Observations	4	4	
Pearson Correlation	0.449435	-	
Pooled Variance	0.0001131		
Hypothesized Mean Difference	0		
ď	3		
t	1.6445927		
P(T⊂t) one-tail	0.0993011		
t Critical one-tail	2.3533634		
P(T<=t) two-tall	0.1986023		
t Critical two-tail	3.1824463		

## # 100 SIEVE

## t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2	
Mean	0.091571	0.0828668	
Variance	4.057E-05	3.481E-05	
Observations	4	4	
Pearson Correlation	0.3582937		
Pooled Variance	3.769E-05		
Hypothesized Mean Difference	0		
ď	3		
t	2.5008765		
P(T<=t) one-tail	0.0438195		1
t Critical one-tail	2.3533634		
P(T<=t) two-tail	0.0876389		
t Critical two-tail	3.1824463		

### # 200 SIEVE

## t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.0588157	0.0512384
Variance	1.166E-05	1.343E-05
Observations	4	4
Pearson Correlation	0.2128736	
Pooled Variance	1.255E-05	
Hypothesized Mean Difference	0	
df	3	
t	3.4088882	
P(T<=t) one-tail	0.0210925	
t Critical one-tail	2.3533634	
P(T<=t) two-tail	0.0421851	
t Critical two-tail	3.1824463	

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		T 0-		4	
1-Test	PREFEC	1WO-53	mole:	TO L	ARDE.

	Variable 1	Variable 2
Meen	0.99291102	0.9920696
Variance	3.7821E-05	
Observations	4	4
Pearson Correlation	0.39744909	•
Peoled Variance	2.8094E-05	
Hypothesized Mean Difference	0	
<b>€</b>	3	
t	0.28349248	
P(Toot) one-tail	0.39761879	
t Critical one-tail	2.35336343	
P(Text) two-tall	0.79523758	
t Critical two-tail	1.18244631	
2/3 alove	G.10211001	

#### LTest Paired Two-Sample for Means

	Variable 1	Variable 2
Moan		0.80306183
Variance		0.00028775
Observations	4	4
Pearson Correlation	-0.31356015	7
Peeled Variance	0.00022877	
Hypothesized Mean Difference	0	
•	3	
t	1.37967217	
P(Tem) one-tail	0.13076855	
t Critical one-tail	2,35336343	
P(Test) two-tail	0.26163711	
t Critical two-tail	1.18244631	

#### \$-Test: Paired Two-Samole for Means

<del></del>	Variable 1	Variable 2
Mong	0.64103271	0.6400685
Vertence	0.0001221	0.00025119
Observations	4	4
Peerson Correlation	0.57105776	•
Pesied Variance	0.00018665	
Hypothesized Mean Difference	. 0	
•	3	
t	0.14649968	
P(Toot) one-tail	0.44640683	
t Critical one-tail	2.25336343	
P(Tort) two-tail	0.89281767	
f Critical two-tail	2.18244631	

#### \$Test Paired Two-Sample for Means

	Variable 1	Variable 2
Moon		0.42441763
Variance		5.7345E-05
Observations	4	4
Pearson Correlation	0.8212687	•
Pooled Variance	0.00034073	
Hypothesized Mean Difference	0	
Œ	3	
t	-0.80175665	
P(T<=0) one-tail	0.24066124	
t Critical one-tail	2.35336343	
P(T<=0) two-tail	0.48132248	
t Ortical two-tail	3.18244631	

#### # 16 SIEVE

## 1-Test: Paired Two-Sample for Means

Variable 1	Variable 2
0.294305369553428	
4	0.000217613677866028
0.2360872672772219	4
0	
3	
-0.271887135585949	
0.401673226979669	
3.18244630501062	
	0.294305369553428 0.000885608479363379 0.2360872622722219 0.000551611178617224 0 0 -0.271887135585949 0.4016732289796699 2.3533634343976 0.80334645389337

#### # 30 SIEVE

## t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.211860607852394	
Variance	0.000695111077372672	0.000228111019201636
Observations	4	4.000220111013201636
Pearson Correlation	0.148236875301085	•
Pooled Variance	0.000461611048287148	
Hypothesized Mean Ofference	0	
Œ	3	
t	-0.0694613396377643	
P(Tc=t) one-tail	0.474496638484124	
t Critical one-tail	2.3533634343976	
P(Toot) two-tail	0.948993276968247	
t Critical two-tall	3.16244630501062	
8 60 RIFVE		

## 1-Test Paired Two-Sample for Meens

	Variable 1	Variable 2
Mean	0.135347475584374	
Variance	0.00030226321688432	
Observations	4	***************************************
Peerson Correlation	0.213952464794077	4
Pooled Variance	0.000197647432266202	
Hypothesized Mean Difference	. 0	
<b>et</b>	3	
t	-0.00250391617219616	
P(Toxt) one-tail	0.499079680390799	
t Critical one-tail	2.3533634343976	
P(T<=0) two-tail	0.998159360781598	
t Critical two-tall	3.18244630501062	
# 100 SIEVE		

## t-Test: Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.0784615175207884	0.0771582364751656
Variance	0.000164847195124347	
Observations	4	
Pearson Correlation	0.646981793223401	•
Pooled Variance	9.07412627684686E-05	
Hypothesized Mean Difference	0	
æ	3	
t	0.244425415661785	
P(T<=t) one-tail	0.411332564615251	
t Critical one-tail	2.3533634343976	
P(T<=t) two-tail	0.822665129230502	
t Critical two-tail # 200 SIEVE	3.18244630501062	

## t-Test Paired Two-Sample for Means

	Variable 1	Variable 2
Mean	0.0434130554004954	0.0353457378191753
Variance	0.000564552534702789	
Observations	4	4.00001200010012-00
Pearson Correlation	0.314661444365681	•
Pooled Variance	0.000284571223752975	
Hypothesized Mean Difference	0	
ď	3	
t	0.696191405735769	
P(T<=t) one-tail	0.268199448921774	
t Critical one-tait	2.3533634343976	
P(T<=t) two-tail	0.536398897843548	
t Critical two-tail	3.18244630501062	

David 6	VAI 00/2000/4404/4/2004		
Page: D = 5	VALCO/ROCKY MOUNTAIN/C	AS PIT	
4 Test Salard Ton Cample South	1/2 SIEVE		#50 SIEVE
1-Test Paired Two-Sample for Mea	ns	t-Test Paired Two-Sample for Mean	
Meen	0.9979335 0.9981915	Mean	Variable 1 Variable 2 0.1185588 0.1172532
Verlance	5.786E-06 5.388E-06	Variance	3.976E-05 5.672E-05
Observations Pearson Correlation	4 4 0.8374793	Observations	4 4
Pooled Variance	5.587E-06	Pearson Correlation Pooled Variance	-0.9363357 4.824E-05
Hypothesized Mean Difference	0	Hypothesized Mean Difference	4.024C-U0
α 1	3 -0.3823281	ď	3
P(T<=t) one-tail	0.3638478	t P(T<=t) one-tull	0.191764
t Critical one-tail	2.3533634	t Critical one-tail	0.4300663 2.3533634
P(Tc=0) two-tail 1 Critical two-tail	0.7276955 3.1824463	P(T<=t) two-tail	0.8601727
	3.1024403	t Critical two-tell	3.1824463
		1-Test Paired Two-Sample for Means	# 100 SIEVE
FTest Paired Two-Sample for Mean	3/6 SIEVE		Variable 1 Variable 2
Transition in Contractor to make	Variable 1 Variable 2	Monn Variance	0.0500736 0.0484693
Meen	0.741515 0.7444998	Observations	4.423E-06 1,339E-05
Variance Observations	0.0005089 0.0001801	Peerson Correlation	-0.9593147
Peerson Correlation	-0.5963528	Pooled Variance	8.906E-06
Pooled Variance	0.0003445	Hypothesized Mean Difference of	0 3
Hypothesized Mean Difference	0	ť	0.5621059
d 1	3 -0.1842071	P(T<=t) one-tail	0.3066531
P(Tc=Q ane-tail	0.4327996	t Critical one-tuil P(T<=t) two-tuil	2.3533634 0.6133061
t Critical one-tail	2.3533634	t Critical two-tail	3.1824463
P(Tori) two-tell 1 Critical two-tell	0.8655992 3.1824463		
	3.1024403		
	#4 SXEVE		₩ 200 SIEVE
6-Test: Paired Two-Sample for Mean		1-Test Paired Two-Sample for Means	
	Variable 1 Variable 2	Meen	Variable 1 Variable 2 0.0278792 0.0273064
Mean Verlance	0.5141660 0.6062019	Variance	2.4385-07 5.25-06
Observations	0.0005058 0.0001513	Observations Peerson Correlation	4 4
Peerson Correlation	-0.3460494	Pooled Variance	-0.7852009 2.7226-06
Pooled Variance Hypothesized Mean Difference	0.0003286	Hypothesized Mean Difference	0
Q	0 3	<b>₫</b>	3
t_	0.5468147	P(T ⇔0 one-tail	0.4266037 0.3492147
P(T <sup>cos</sup> ) one-tail 1 Critical one-tail	0.3112771	t Critical one-tail	2.3533634
P(T<=0 two-tail	2.3533634 0.6225541	P(T<=0 two-tail t Critical two-tail	0.6984294
LI I A MONTH			
t Critical two-tail	1.1824463	CALL BOOK	3.1824463
	8.1824463		3.1824463
	\$.1824463 # & SIEVE		3.1824463
t Critical two-tail  4-Test: Paired Two-Sample for Moans	3.1824463 # 8 SIEVE Variable 1 Variable 2	TORKE BOLL	3.1624463
t Critical two-fail  1-Test: Paired Two-Sample for Moans  Mean Variance	\$.1824463 # & SIEVE		3.1824463
t Critical bro-fait  1-Test: Paired Two-Sample for Means Wertence Observations	2.1824463 # 8 SEVE Variable 1 Variable 2 0.4551052 0.4471086 0.0004039 0.0001257		ā.1824463
t Critical bro-fait  4-Test: Paired Two-Sample for Means Mean Variance Observations Peanson Correlation	2.1824463 8.8 SEVE Variable 1 Variable 2 0.4551052 0.4471086 0.0004039 0.0001267 4 4 -0.53873		<b>3.162446</b> 3
t Critical bro-fait  1-Test: Paired Two-Sample for Means Wertence Observations	2.1824463 # 8 SEVE Variable 1 Variable 2 0.4551052 0.4471086 0.0004039 0.0001257		<b>3.162446</b> 3
1 Critical bro-fait 1-Test Paired Two-Sample for Mosan Mean Verlance Observations Pearson Correlation Pooled Variance	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873  0.0002653  0  3		3.1824463
t Critical bro-fait  1-Test: Paired Two-Sample for Means  Mean Verlance Observations Pearson Correlation Pooled Verlance Hypothesized Mean Difference of	2.1824463  # 8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873  0.0002653  0  0.5747119		3.1824463
t Critical two-fait  4-Test: Paired Two-Sample for Means  Mean  Variance Observations Peanson Correlation  Page 10 Variance Hypothesized Mean Difference	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873  0.0002653  0  3		3.1824463
t Critical two-test  t-Test: Paired Two-Sample for Means  Mean Verlance Observations Peerson Correlation Pooled Variance Hypothesized Mean Difference of t P(T-ori) one-test P(T-ori) two-test P(T-ori) two-test P(T-ori) two-test	2.1824463  # 8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873  0.0002653  0  3  0.5747119  0.3023769  2.3533634  0.6057537		3.1824463
t Critical two-tail  4-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothestzed Mean Difference of t PCT=0 one-tail t Critical one-tail	2.1824463  8 8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873  0.0002653  0  3  0.5747119  0.3028769  2.3533634		3.1824463
t Critical two-test  t-Test: Paired Two-Sample for Means  Mean Verlance Observations Peerson Correlation Pooled Variance Hypothesized Mean Difference of t P(T-ori) one-test P(T-ori) two-test P(T-ori) two-test P(T-ori) two-test	2.1824463  # 8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873  0.0002653  0  3  0.5747119  0.3023769  2.3533634  0.6057537		3.1824463
t-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooted Variance Hypothestized Mean Difference of t t TCTical one-tail P(T-on) ane-tail t Critical two-tail t Critical two-tail	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004033 0.0001267  4  -0.53873 0.0002653 0 3 0.5747719 0.3028769 2.3533634 0.6057537 3.1824463		3.1824463
t Critical two-test  t-Test: Paired Two-Sample for Means  Mean Verlance Observations Peerson Correlation Pooled Variance Hypothesized Mean Difference of t P(T-ori) one-test P(T-ori) two-test P(T-ori) two-test P(T-ori) two-test	2.1824463  8 8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873  0.0002653  0  3  0.5747119  0.3028769  2.3533634  0.6057537  3.1824463		3.1824463
t-Test Paired Two-Sample for Means Mean Variance Observations Peanson Correlation Pooled Variance Hypothestized Mean Difference of t PT-on) one-tail t Critical one-tail t Critical two-tail t Critical two-tail	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 3 0.5747719 0.3023769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226		3.1824463
t Critical two-test  #-Test: Paired Two-Sample for Means  Mean  Variance Observations Peaces Correlation Pooled Variance Hypothestzed Mean Difference of  ###  ###  ###  ###  ###  ###  ###	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 0.53747119 0.3028769 2.3533634 0.6057537 3.1824463  8.16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226 0.0002298 0.0002221		3.1824463
t-Test Paired Two-Sample for Means Mean Variance Observations Peanson Correlation Pooled Variance Hypothestized Mean Difference of t PT-on) one-tail t Critical one-tail t Critical two-tail t Critical two-tail	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 3 0.5747719 0.3023769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226		3.1824463
t Critical two-tail  #-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothestzed Mean Difference of t Critical one-tail t Critical one-tail t Critical two-tail  #-Test: Paired Two-Sample for Means Variance Observations Pearson Correlation Pooled Variance Pooled Variance	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873  0.0002653  0  3  0.5747119  0.0028769  2.3533634  0.6057537  3.1824463  8.16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513226  0.0002998 0.0002221		3.1824463
t Critical two-tail  t-Test Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference of t Terrical one-tail t Critical two-tail t Critical two-tail t Critical two-tail t-Test Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Peosel Variance Hypothesized Mean Difference	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873  0.002653  0  3  0.5747119  0.0028769  2.3533634  0.6057537  3.1624463  # 16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513226  0.0002998 0.0002221  4  -0.6146216  0.0002609  0		3.1824463
t Critical two-tail  #-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothestzed Mean Difference of t Critical one-tail t Critical one-tail t Critical two-tail  #-Test: Paired Two-Sample for Means Variance Observations Pearson Correlation Pooled Variance Pooled Variance	2.1624463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 0.5747119 0.302769 2.3533634 0.6057537 3.1624463  8.16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226 0.0002998 0.0002221 4  -0.6148216 0.0002609 0 0 3		3.1824463
## Critical two-tail  ### Critical two-tail  #### Committee  #### Committee  ###	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873  0.002653  0  3  0.5747119  0.0028769  2.3533634  0.6057537  3.1624463  # 16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513226  0.0002998 0.0002221  4  -0.6146216  0.0002609  0		3.1624463
t-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothestzed Mean Difference of t PT-ori) one-tail t Critical one-tail t Critical two-tail t Critical two-tail t Critical wo-tail t Critical two-tail t Critical one-tail	2.1824463  8.8 SEEVE  Variable 1 Vartable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873 0.002653 0 0.5747119 0.3028769 2.3533634 0.6057537 3.1624463  # 16 SIEVE  Variable 1 Vartable 2 0.3518497 0.3513226 0.0002998 0.0002221  -0.6148216 0.0002609 0 0 0 0 0 0 0.0363915 0.4866281 2.3533634		3.1824463
## Critical two-tail  ### Critical two-tail  #### Committee  #### Committee  ###	2.1824463  2.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 3 0.5747119 0.3028769 2.3533634 0.6057537 3.1624463  # 16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513226 0.0002938 0.0002221 4  -0.6148216 0.0002699 0 3 0.0363915 0.4866281 2.3533634 0.9732563		3.18244C3
## Critical two-tail  ### Test: Paired Two-Sample for Means  Mean  Variance Observations  Peace Correlation  Pooled Variance Hypothesized Mean Difference  ####  ####  ######################	2.1824463  8.8 SEEVE  Variable 1 Vartable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873 0.002653 0 0.5747119 0.3028769 2.3533634 0.6057537 3.1624463  # 16 SIEVE  Variable 1 Vartable 2 0.3518497 0.3513226 0.0002998 0.0002221  -0.6148216 0.0002609 0 0 0 0 0 0 0.0363915 0.4866281 2.3533634		3.18244C3
## Critical two-tail  ### Test: Paired Two-Sample for Means  Mean  Variance Observations  Peace Correlation  Pooled Variance Hypothesized Mean Difference  ####  ####  ######################	2.1824463  2.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873  0.0002653  0  3  0.5747119  0.3028769  2.3533634  0.6057537  3.1624463  # 16 SIEVE  Variable 1 Variable 2  0.2518497 0.3513226  0.0002938 0.0002221  4  -0.6145216  0.0002699  0  0  0  0  0  0.303915  0.4866281  2.3533634  0.9732563  3.1824463		3.1824463
## Critical two-tail  ### Test: Paired Two-Sample for Means  Mean  Variance Observations  Peace Correlation  Pooled Variance Hypothesized Mean Difference  ####  ####  ######################	2.1824463  2.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004033 0.0001267  4  -0.53873 0.0002653 0 3 0.5747119 0.302769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513228 0.0002998 0.0002291 4  -0.6148216 0.0002609 0 3 0.0363915 0.4865(281 2.3533634 0.9732563 3.1824463		3.1624463
## Critical two-tail  ## Critical one-tail  ## Critical one-tail  ## Critical one-tail  ## Critical two-tail	2.1824463  2.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873  0.0002653  0  3  0.5747119  0.3028769  2.3533634  0.6057537  3.1824463  # 16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513226  0.0002938 0.0002221  4  -0.6148216  0.0002609  0  0  0  0  0  0.353915  0.4866281  2.3533634  0.9732563  3.1824463  # 30 SIEVE  Variable 1 Variable 2		3.1624463
## Critical bro-ball  ### Critical bro-ball  #### Critical bro-ball  #### Critical bro-ball  #### Critical bro-ball  ##################################	2.1824463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004033 0.0001267  4  -0.53873 0.0002653 0 3 0.5747119 0.302769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513228 0.0002998 0.0002998 0.0002291 4  -0.6148216 0.0002609 0 3 0.0363915 0.4865281 2.3533634 0.9732563 3.1824463  # 30 SIEVE  Variable 1 Variable 2 0.2581033 0.2802045		3.1624463
## Critical two-tail  ### Critical two-tail  #### Critical two-tail  #### Critical two-tail  #### Critical two-tail  ##### Critical two-tail  ###################################	2.1824463  2.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 3 0.5747119 0.3022769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513226 0.0002998 0.0002221  4  -0.6148216 0.0002609 0 3 0.0363915 0.4866281 2.3533634 0.9732563 3.1824463  # 30 SIEVE  Variable 1 Variable 2 0.2581033 0.2602045 0.00011999 0.0002112		3.1624463
t-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothestzed Mean Difference of t PT-ori) one-tail t Critical one-tail t Critical two-tail t Critical two-tail t Critical one-tail pT-ori) two-tail t Critical for Means Mean Variance Observations Pearson Correlation Pooled Variance Hypothestzed Mean Difference of t t PT-ori) one-tail t Critical one-tail PCT-ori) two-tail t Critical one-tail t Critical two-tail t Critical one-tail t Critical two-tail t Critical two-tail t-Test: Paired Two-Sample for Means Mean Variance Observations Pearson Correlation	2.1624463  2.8 SEEVE  Variable 1 Vartable 2  0.4551052 0.4471086  0.0004039 0.0001257  4  -0.53873 0.0002653 0 0.5747119 0.3023769 2.3533634 0.6057537 3.1624463  2.1624463		3.1624463
## Critical two-tail  ### Critical two-tail  #### Critical two-tail  #### Critical two-tail  #### Critical two-tail  ##### Critical two-tail  ###################################	2.1824463  2.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 3 0.5747119 0.3022769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2  0.3518497 0.3513226 0.0002998 0.0002221  4  -0.6148216 0.0002609 0 3 0.0363915 0.4866281 2.3533634 0.9732563 3.1824463  # 30 SIEVE  Variable 1 Variable 2 0.2581033 0.2602045 0.00011999 0.0002112		3.16244C3
### Test: Paired Two-Sample for Means  Mean  Wartance Observations Pearson Correlation Pooled Variance Hypothesized Mean Difference of  P(Tort) one-tail 1 Critical one-tail P(Tort) two-tail 1 Critical two-tail  ###################################	2.1624463  8.8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4  -0.53873 0.0002653 0 0.5747119 0.3028769 2.3533634 0.6057537 3.1624463  8.16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226 0.0002998 0.0002221 4  -0.6148216 0.0002609 0 0 3 0.0363915 0.4866281 2.3533634 0.9732563 3.1624463  8.30 SIEVE  Variable 1 Variable 2 0.2581033 0.2602045 0.0001999 0.0002112 4  -0.7847108 0.0002056 0 0 3		3.1624463
## Critical two-tail  ### Critical two-tail  #### Critical two-tail  #### Critical two-tail  #### Critical two-tail  ##### Critical two-tail  ###################################	2.1824463  2.8 SEEVE  Variable 1 Variable 2 0.4551052 0.4471086 0.0004039 0.0001267 4 -0.53673 0.0002653 0 3 0.5747119 0.3022769 2.3533634 0.6057537 3.1624463  # 16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226 0.0002998 0.0002221 4 -0.6148216 0.0002609 0 3 0.0363915 0.4866281 2.3533634 0.9732563 3.1624463  # 30 SIEVE  Variable 1 Variable 2 0.2581033 0.2602045 0.0001999 0.00002112 4 -0.7847108 0.0002056 0 0 3 -0.1551552		3.1624463
## Critical two-tail  ### Critical two-tail  #### Critical two-tail  #### Critical two-tail  ##### Critical two-tail  ###################################	2.1824463  8 8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4 -0.53873 0.0002653 0 3 0.5747119 0.3028769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226 0.0002998 0.0002221 4 -0.6148216 0.0002609 0 3 0.0363915 0.4866281 2.3533634 0.9732563 3.1824463  # 30 SIEVE  Variable 1 Variable 2 0.2581033 0.2602045 0.0001999 0.0002112 4 -0.7847108 0.0002056 0 0 3 -0.1551552 0.4432752 2.3533634		3.1624463
## Critical two-tail	2.1824463  2.8 SEEVE  Variable 1 Variable 2 0.4551052 0.4471086 0.0004039 0.0001267 4 -0.53873 0.0002653 0 3 0.5747119 0.3022769 2.3533634 0.6057537 3.1624463  # 16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226 0.0002998 0.0002221 4 -0.6148216 0.0002609 0 3 0.0363915 0.4866281 2.3533634 0.9732563 3.1824463  # 30 SIEVE  Variable 1 Variable 2 0.2581033 0.2602045 0.0001999 0.0002112 4 -0.7847108 0.0002056 0 0 3 -0.1551552 0.4432752 2.353634 0.9885564		3.1624463
## Critical two-tail  ### Critical two-tail  #### Critical two-tail  #### Critical two-tail  ##### Critical two-tail  ###################################	2.1824463  8 8 SEVE  Variable 1 Variable 2  0.4551052 0.4471086  0.0004039 0.0001267  4 -0.53873 0.0002653 0 3 0.5747119 0.3028769 2.3533634 0.6057537 3.1824463  # 16 SIEVE  Variable 1 Variable 2 0.3518497 0.3513226 0.0002998 0.0002221 4 -0.6148216 0.0002609 0 3 0.0363915 0.4866281 2.3533634 0.9732563 3.1824463  # 30 SIEVE  Variable 1 Variable 2 0.2581033 0.2602045 0.0001999 0.0002112 4 -0.7847108 0.0002056 0 0 3 -0.1551552 0.4432752 2.3533634	R-Q	3.1624463

## MONK MIX

GRADATION COMPARISON USING THE NCAT OVEN TABLE B REPRESENTS THE GRADATION OF THE AGGREGATE WITH NO ASPHALT ADDED

TABLE A REPRESENTS THE GRADATION OF THE AGGREGATE AFTER ASPHALT WAS ADDED AND BURNT OFF INSIDE THE NCAT OVEN

	THE AGGREGATE	AFTER ASPHALT WAS ADDED AND BURNT OFF INSIDE THE NCAT OVEN
	TABLE A	TABLE
14		A
Gradetlo: X	AGGREGATE, LIME ADDED	18
11-01-05	Led# NCAT NONK-1	X Gredetion Analysis Lab # MON NC#
		11-01-05 Lab # MONCS
Sleve	A A A A A A A A A A A A A A A A A A A	
11/2	each slevreach sleve size	Sleve Weight not Percent passing
1	100,00%	esch sieve sech sieve stre
1/2	6.1 99,47%	1 100,00%
345 84	199.8 82.21% 227.4 62.66%	1/2 6.2 89.50%
<b>#8</b>	283.9 38.03%	3/6 241.9 80.09% 84 216.3 677***
#16 #30	149.2 25.14%	. 68 266 41.40%
#50	<b>69.2</b> 17,44% 73.2 11.11%	#16 155.8 28.90%
#100 #200	63.1 6.52%	#50 #2.1 13.19v
-#200 -#200	36.8 I.TK	#100 65.4 7.65%
-200 w	est \$3.7	#200 49.1 3.72% -#200 2.9
Total	1157.4	-200 west 43.5
		Total: 1246.4
Gradatio: X	laha we	1470,9
11-01-05	LAD# MCAT MORRCZ	Asmata
		Gredetion Analysis Lab # MONOCS
Sieve	Weight not Percent passing	11-01-05
	each sievceach sieve size	Sleve Weight not Percent passing
112	600 no.	each slow each slow stra
1/2	17.6 BG.53% Contract gradeson	11/2
36 61	1783 8361Y	1/2 8.8 89.24%
-	222.3 \$5.02%	3/6 267.2 78.83%
<b>8</b> 6 <b>8</b> 16	267 '42.68%	84 196 63.02K
<b>630</b>	142 30.80% 96.8 22.54%	86 260.5 43.19% 816 148.4 31.00
<b>#50</b>	83 14.76%	#16 148.4 31.80% #30 108.9 23.72%
#100 #200	62 8.57% 19.9 7.91%	850 1073 1477%
-#200	12	#100 #3.6 #.27% #200 \$6.5 3.63%
-200 wes	* <b>83.3</b> 7777	-47200 4.2
Total	1195.4	-200 west 42.5
	<del></del> -	Total: 1284.9
Gradatio: X	Lab# NCAT	
11-01-05	MORKS	
_		Gradation Analysis Lab # MORECT
Sieve	Weight red Percent pessing	11-01-05 Lab # MONEC?
1 1/2	each slevt each sleve size	Slave Weight ret Percent passing
1 12	100,00% correct graduation	99CTI SIGNE GOCH SIGNE STOR
36	10.8 80,16% 225.8 81,66%	1 1/2
<b>e</b> 4	218.3 61.78%	100.00% 1/2 17.3 \$6.59%
#8 #16	272.2 43.70% 152.4 31.90%	3/8 194.8 82,73%
<b>#30</b>	109.7 23.41%	84 2015 8632% 88 293,7 42,41%
#50 #100	110.7 14.84%	#16 172.4 28.37%
#200	89.4 7.91% 61.6 3.14%	#30 107 19.66%
-#200 -200	3	#100 64,1 7,28%
-200 west	37.6	#200 45.8 1.55%
Total	1291.5	-#200 3.3 -200 wast 40.3
		•
Gradellor X 11-01-95	Lab# HCAT	Total: 1228.2
· (-95)	MOHK-4	
Sieve (	MAC-1-A-A	NON NC
	Weight net Percent pessing sech siewreach sieve size	Gradation Analysia Lab# MONIC8
1 1/2		
1 1/2	100,00% correct gradation 100,00%	Sleve Weight ref Percent passing
3/6	251.5 80,47%	each slovreach sleve size
.#4 #8	211.3 64.06%	1 100.00%
#16	159.5 29.88%	1/2 6.7 99.50% 3/6 265.1 79.56%
#30 #50	109.6 21.37%	#4 213.4 63.54%
#100	102.1 13.44% 78 7.38%	#8 275.9 42.81%
#200	54.5 3.15%	#30 115.3 21.81%
-4/200 -200 wast	4.2 36.3	#50 107.6 13.73%
		#100 80.8 7.66% #200 58.9 3.23%
Total	1267.6	4200 4.6
•		-200 west 38.4 B-
		Total: 1330,8
		•

## Raiston MIX

# GRADATION COMPARISON USING THE NCAT OVEN TABLE A REPRESENTS THE GRADATION OF THE AGGREGATE WITH NO ASPHALT ADDED

TABLE B REPRESENTS THE GRADATION OF THE AGGREGATE AFTER ASPHALT WAS ADDED AND BURNT OFF INSIDE THE NCAT OVEN

											AI OVEN
			BLE A					TAB	LE		
14			^					B			
		ACCO	GATE I	ME ADDED		18					
Gradet	ior X	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Labe	non-HC							NCAT
10-26-0	25			Rel-5	~'	X	Grade	rtion Analysi	•	Leb#	Ral-1
							10-26	<b>-9</b> 5			
	Sieve	Weight	et Percent	pessing				~	*****		
		each sie	w each sk	rve size				Sieve	Weight re	t Percen	d passing
	1 1/2							1 1/2	each slev	t each si	eve stze
	1		100,00	*	correct gradation			1		400.04	<b></b>
	1/2	11.	7 99.06	×				1/2		100.00	
	3/6	26	9 77.93	<b>%</b>				3/8	30.1		
	#4	174.	8 64,19	<b>%</b>				#4	224.4 184.4		
	#6	30		×				#8	291.9		
	#16	188.						#16	173.7		
	#30	120.		K				#30			
	#50	94.	8.22	×				#50	120 104.8		
	#100	46.						#100	653	10.02 5.62	
	#200	26.		K				#200	<b>32.</b> 7	3.01	
	-#200		2					-6200	2.6	3.01	*
	-200 was	n 28.1	9					-200 west			
			_								
	Total	1271.	}					Total	1255.1		
					_						
Gradeti	or Y		1.4	non-NCA	ıT.						NCAT
11-01-0			Lab#	Rai-6	•		Gradet	ion Analysis		Lab#	Rel-2
	Sieve	-		-			11-01-6	XS .			
		and also	t Percent p Teach sie	A STATE				Sieve	Weight not	Percent	pessing
	1 1/2		-						each sleve	each sie	we stoe
	1		100,009	Ł				1 1/2			
	1/2	13.8			correct gradation			1		100.00	
	3/6	256.7						1/2	15	96.76	K.
	84	180						3.6	205	81,801	K.
	#6	306.6						84	183.5	66.62	
	#16	197.9						#8	309.4	41,02	
	<b>6</b> 30	133.9						#16	181.4	26.011	
	#50	112.1						#30	117.5	16.291	
	#100	66.43						#50	94.4	8,481	
	<b>#200</b>	32.6						#100	46.3	4.653	
	<b>-#200</b>	3						#200 -#200	26.7	2.449	6
	-200 week	313						-200 west	21		
								-COLO MICHIE	27.A		
	Total	1326.53						Total	12017		
	(OM)	1326.53						Total	1206.7		
<i>a m</i> -		1326.53		non-NCA	r			Total	1208.7		NCAT
Gradatio	۴X	1326.63	Labif	non-NCAT	г		Gradeti			lanh at	NCAT Rel3
Gradatio 11-01- <b>8</b> 5	rΧ			Rei-7	r		Gradeti 11-01-8	on Analysis		Lab#	NCAT Rai-3
	۴X	Weight red	Percent	Rei-7	r		Gradati 11-01-8	on Analysis 5			Rel-3
	rX Sleve		Percent	Rei-7	г		Gradeti 11-01-8	on Analysis 5 Sieve		Percent p	Rel-3 Hassing
	CX Sleve 1 1/2	Weight red	Percent p	Rai—7 essing e size			Gradeti 11-01-8	on Analysis 5 Sieve	l Weight net i	Percent p	Rel-3 Hassing
	CX Sleve 1 1/2	Weight rai	Percent presch sieve	Rai—7 essing e size	CORRECT gradution		Gradeti 11-01-8	on Analysis 5 Slove 1 1 1/2	Weight ret i each sleve	Percent p	Rai-3 ressing resize
	Eleve 1 1/2 1 1/2	Weight rai each sieve	Percent percent percent siew 100,00% \$9,05%	Rai—7 essing e size			Gradati 11-01-8	on Analysis 5 Slove 1 1 1/2 1 1/2	Weight ret i each sleve	Percent p each slev	Rel-3 pessing resize
	CX Sleve 1 1/2	Weight rate each slew 11.3 239.3	Percent posent posent sieve 100,00% 89,06% 79,69%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/8	Weight not it each sleve of 24.2 222.2	Percent pech siev 100,00% 95,11% 80,78%	Rel-3 ressing restze
	CX Sleve 1 1/2 1 1/2 3/6	Weight rai each sieve	100,00% 100,00% 100,00% 19,06% 79,69%	Rei—7 essing e size			Gradati 11-01-8	on Analysis Sieve 1 1 1/2 1 1/2 3/8 8/4	Weight not it each sleve of 24.2 222.2 193.4	Percent percent percent sion 100,00% 95,11% 80,78% 65,59%	Rai-3 ressing restze
	Sleve 1 1/2 1 1/2 3/5 8/4	Weight not each slew 11.3 239.3 168.2	Percent posent posent sieve 100,00% 89,06% 79,69%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1/2 1 1/2 3/6 84	24.2 222.2 193.4 328	Percent percent percent siev 100,00% 96,11% 80,78% 65,69% 40,10%	Rel-3 ressing restze
	Sleve 1 1/2 1 1/2 3/5 8/4	Weight rai each slew 11.3 239.3 168.2 324.3	100,00% 100,00% 100,00% 79,69% 66,05% 39,76%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/6 84 88 816	24.2 22.2 29.4 328 194.6	Percent percent percent sieve 100.00% 96.11% 80.76% 65.69% 40.10% 24.91%	Ral-3 Dessing to size
	FX Sleve 1 1/2 1 1/2 3/5 #4 #8 #16 #30 #50	Weight rai each sieve 11.3 239.3 168.2 324.3 184.9	100,00% 99,06% 79,69% 66,05% 39,76% 24,77%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/5 84 88 816 830	24.2 222.2 293.4 328 194.6 121.6	Percent percent percent sieve 100.00% 96.11% 80.76% 65.69% 40.10% 24.91% 15.42%	Ref-3 ressing restze
	1 1/2 1 1/2 3/5 4/4 4/8 4/16 4/30 4/50 4/100	Weight not each sieve 11.3 239.3 168.2 324.3 184.9 115.7 90.2	100,00% 89,06% 79,69% 66,05% 39,76% 24,77% 15,39%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/8 84 #8 #16 #30	24.2 22.2 22.2 193.4 328 194.6 121.5 94	Percent percent percent sieved 100.00% 96.11% 80.76% 65.69% 40.10% 24.91% 15.42% 8.09%	Ref-3 passing re size
	1 1/2 1 1/2 3/6 84 81 816 830 850 8100 8200	Weight rate each sleve 11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2	100,00% 89,06% 79,69% 66,05% 39,76% 24,77% 15,39% 8,06%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/8 84 88 816 830 850 8100	24.2 22.2 27.2 193.4 328 194.6 121.6 94 45.4	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
	1 1/2 1 1/2 1 1/2 3/5 84 83 830 850 8100 8200 47200	Weight not each sient 11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3	100,00% 89,06% 79,69% 66,05% 39,76% 24,77% 15,39% 8,06% 4,60%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/8 84 #8 #16 #30	24.2 22.2 22.2 193.4 32.6 194.6 121.6 94 45.4 25.5	Percent percent percent sieved 100.00% 96.11% 80.76% 65.69% 40.10% 24.91% 15.42% 8.09%	Ref-3 pessing re size
	1 1/2 1 1/2 3/6 84 81 816 830 850 8100 8200	Weight rate each sieve 11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3	100,00% 89,06% 79,69% 66,05% 39,76% 24,77% 15,39% 8,06% 4,60%	Rei—7 essing e size			Gradati 11-01-8	5 Sieve 1 1/2 1 1/2 1 1/2 3/6 #4 #6 #6 #30 #50 #100 #200	24.2 22.2 27.2 193.4 328 194.6 121.6 94 45.4	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
	1 1/2 1 1/2 1 1/2 3/6 84 81 810 850 8100 8200 -8200 -2000 westh	Weight red each sleve 11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2	100,00% 89,06% 79,69% 66,05% 39,76% 24,77% 15,39% 8,06% 4,60%	Rei—7 essing e size			Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/8 84 88 816 830 850 #100 #200	24.2 22.2 22.2 193.4 32.6 194.6 121.6 94 45.4 25.5	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
	1 1/2 1 1/2 1 1/2 3/5 84 83 830 850 8100 8200 47200	Weight not each sient 11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3	100,00% 89,06% 79,69% 66,05% 39,76% 24,77% 15,39% 8,06% 4,60%	Rei—T essing e size	correct gradeficn		Gradati 11-01-8	on Analysis 5 Sieve 1 1 1/2 1 1/2 3/8 84 88 816 830 850 #100 #200	24.2 27.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
11-01- <b>e</b> 5	Total:	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2	Percent present slevel 100,00% \$9,06% 79,59% 66,05% 39,76% 24,75% 8,06% 4,60% 2,63%	Rei—T essing e size	correct gradeficn		Gradati 11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 84 88 816 830 850 8100 8200 -8200 -200 wash	24.2 22.2 22.2 193.4 32.6 194.6 121.6 94 45.4 25.5	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
i 11-01-85	Total:	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2	Percent present slevel 100,00% \$9,06% 79,59% 66,05% 39,76% 24,75% 8,06% 4,60% 2,63%	Rei—T essing e size	correct gradeficn		Gradati 11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 84 88 816 830 850 8100 8200 -8200 -200 wash	24.2 27.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
11-01- <b>e</b> 5	Fig. 2 Sieve 1 1/2 1 1/2 3/6 8/4 8/5 8/5 8/5 8/5 8/50 8/500 -8/200 -8/200 -2/200 westh	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2	Percent p.	Rei—T essing e size non-NCAT Rai—8	correct gradeficn		Gradati 11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 84 88 816 830 850 8100 8200 -8200 -200 wash	24.2 27.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
i 11-01-85	T 1/2 1 1/2 3/6 84 850 8160 8200200 wesh Total: X	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2 1233.6 Weight ret	Percent present page 100.00% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63%	Rei—T essing este non-NCAT Rai—B essing	correct gradeficn		Gradati 11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 84 88 816 830 850 8100 8200 -8200 -200 wash	24.2 27.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
i 11-01-85	Sleve 1 1/2 1 1/2 3/6 84 85 816 830 850 8100 8200 -4200 -2000 westh Total: X	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2	Percent present page 100.00% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63%	Rei—T essing este non-NCAT Rai—B essing	correct gradeficn		Gradati 11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 84 88 816 830 850 8100 8200 -8200 -200 wash	24.2 27.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Ref-3 pessing re size
i 11-01-85	T 1/2 1 1/2 3/6 84 850 8160 8200200 wesh Total: X	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2 1233.6 Weight ret	Percent presch sieve 100.00% 99.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63%  Lab # Percent present sieve	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis 5 Sieve 1 1/2 1 1/2 3/8 84 88 816 830 850 #100 #200 -200 wash	24.2 22.2 22.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percen	Rei-3 Ressing Reize
i 11-01-85	FIX Sieve 1 1/2 1 1/2 3/6 #4 #5 #5 #5 #5 #5 #5 #5 #5 #5 #5 #5 #5 #5	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2 1233.6 Weight ret	Percent preschieves 100.00% 19.09% 19.09% 66.05% 39.76% 24.77% 15.39% 8.06% 4.60% 2.63% Lab # Percent preschieves 100.00%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve   1 1/2   1 1/2   3/8   #4   #8   #16   #30   #50   #100   #200   -200   wash   Total:	24.2 22.2 22.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percent percent sieve 100,00% 98,11% 80,78% 65,69% 40,10% 24,91% 15,42% 8,09% 4,55%	Rei-3 messing resize
i 11-01-85	Sleve 1 1/2 1 1/2 3/6 8/16 8/30 8/50 8/200 -8/200 wesh Total: X Sleve 1 1/2 1	Weight rate each sieve 11.3 239.3 168.2 324.3 185.7 155.7 90.2 43 31.2 1233.6 Weight rate each sieve	Percent presch sieve 100.00% 9.05% 9.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent presch sieve 100.00% 98.65% 98.65%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve  1 1/2 1/2 3/6 #4 #8 #16 #30 #30 #200 -#200 -#200 -#200 -#200 Total:	24.2 22.2.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent percen	Rei-3 Dessing Desize NCAT Rei-4
i 11-01-85	Sieve 1 1/2 1 1/2 3/6 8/4 8/3 8/30 8/50 8/100 8/50 -4/200 -2/200 wesh Total: X Sieve 1 1/2 1 1/2	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2 1233.6 Weight ret each sieve	Percent preschieves 100.00% 19.09% 19.09% 66.05% 39.76% 24.77% 15.39% 8.06% 4.60% 2.63% Lab # Percent preschieves 100.00%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve 1  1 1/2  1 1/2  3/8  #1  #1  #1  #1  #1  #1  #1  #1  #1  #	24.2 27.2.2 193.4 32.8 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent precision of the control of	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
i 11-01-85	Sieve 1 1/2 1 1/2 3/6 814 83 816 850 850 850 8200 -200 west 1 1/2 1 1/2 3/6 84 88 84 88 84 88	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2 1233.6 Weight ret each sleve	Percent presch sieve 100.00% 99.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent presch sieve 100.00% 98.69% 81.77%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sleve 1  1 1/2  1 1/2  3/8  #1 6  #30  #50  #100  #200  -200 wash  Total:  Sleve V	24.2 22.2.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9	Percent precision of the control of	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
i 11-01-85	Sleve 1 1/2 1 1/2 3/6 #16 #100 wesh Total: X Sleve 1 1/2 1 1/2 1 1/2 3/6 #4 #8 #16 #100 #200 wesh Total: X	Weight ret each siew 11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 31.2 1233.6 Weight ret each siew 16.2 210 186.8	Percent presch sieve 4.60% 26.3% Lab # Percent presch sieve 100.00% 98.69% 81.77% 65.9% 66.71% 65.71% 65.71% 65.71% 66.71% 66.71%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve 1  1 1/2  1 1/2  3/6  #4  #8  #16  #30  #30  #200  -#200  -#200  -#200  -#200  Total:  Sieve V	24.2 22.2.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent pt 100,00% 98,11% 80,76% 98,11% 80,76% 98,11% 80,76% 95,65% 45,10% 24,91% 15,40% 4.55% 2.56% 455% 2.56% 456% 80,65% 80,6	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
i 11-01-85	8 Sieve 1 1/2 1 1/2 3/6 #16 #16 #16 #16 #16 #16 #16 #16 #16 #1	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 13 31.2 1233.6 Weight ret each sleve	Percent presch sieve 100.00% 39.05% 39.76% 39.76% 45.07% 4.60% 2.63% Lab # Percent precent sieve 100.00% 81.77% 66.71% 43.16% 43.16% 43.16%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve 1  1 1/2  1 1/2  3/8  #16  #30  #100  #200  -200 wash  Total:  Sieve V	24.2 22.2 22.2 193.4 194.6 121.5 94 45.4 25.5 1.9 30.9 1281.7	Percent pt 100.00% 98.11% 80.76% 98.11% 80.76% 65.55% 15.42% 4.10% 24.91% 15.42% 4.55% 2.56% 4.55% 2.56% 60.00% 60.00%	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
i 11-01-85	Sieve 1 1/2 1 1/2 3/6 8/4 8/8 8/16 8/30 8/50 8/100 westh Total: X Sieve 1 1/2 1/2 3/6 8/4 8/8 8/16 8/50 8/50 8/50 8/50 8/50 8/50 8/50 8/50	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1.3 3.3 12 1233.6 Weight ret each sleve	Percent prescription of the control	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 84 88 816 830 850 8100 8200 -8200 -200 wash Total: Sieve V	24.2 22.2 193.4 328 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent pt 100,00% 98,11% 80,70% 96,11% 80,70% 96,11% 80,70% 45,50% 45,62% 4,55% 2,56% 45,56% 45,56% 96,25% 96,23% 96,23% 96,23% 96,23% 96,23%	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
i 11-01-85	# 14/2  1 14/2  1 14/2  3/6  #44  #64  #650  #700	Weight ret each siew 11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 13.3 31.2 1233.6 Weight ret each siew 241.0 162.2 210.0 186.8 291.9 183.3 127.1	Percent presch sieve 4.60% 26.3% 4.60% 2.63% Lab # Percent presch sieve 100.00% 98.69% 43.16% 43.16% 43.16% 48.15% 18.15%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve 1  1 1/2  1 1/2  3/8  #4  #8  #16  #30  #200  -#200	24.2 22.2 22.2 193.4 32.8 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent process of the control of th	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
i 11-01-85	## 142 1 1/2 3/8 ## 16 #	11.3 239.3 1682.2 324.3 184.9 115.7 90.2 43 24.2 1.3 31.2 1233.6 Weight ret each sieve	Percent presch sieve 100.00% 39.05% 79.65% 39.76% 24.77% 15.35% 4.60% 2.63% Lab # Percent presch sieve 100.00% 81.77% 66.71% 43.16% 28.40% 18.15% 9.46% 9.46%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve   1 1/2   1 1/2   3/8   #16   #30   #50   #100   #200   -200   wash   Total:  Sieve   V   0   1 1/2   1 1/2   3/8   #4   #4   #4   #4   #4   #4   #4   #	24.2 22.2.2 193.4 328 194.6 121.6 12.5 1.9 30.9 1281.7	Percent pt 100.00% 98.11% 80.76% 65.55% 115.42% 4.10% 24.91% 15.42% 4.55% 2.56% 100.00% 98.23% 66.90% 66.90% 66.90% 66.90% 66.90% 66.90% 66.90%	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	FX Sieve 1 1/2 1 1/2 3/6 #16 #16 #16 #17 1 1/2 1 1/2 3/6 #16 #16 #17 1 1/2 1 1/2 3/6 #16 #16 #16 #16 #16 #16 #16 #16 #16 #1	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 31.2 1233.6 Weight ret each sieve 16.2 210 186.8 231.9 163.3 127.1 107.6 52.8 29.7 1.8	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve 1  1 1/2  1 1/2 3/8  #16 #30 #50 #100 #200 -#200 -#200 -#200 -#200 -#200 -100	24.2 22.2 193.4 32.8 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent pt 100.00% 98.11% 80.78% 65.53% 65.53% 45.55% 22.56% 82.25%	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	## 142 1 1/2 3/8 ## 16 #	Weight ret each siew 11.3 239.3 168.2 1233.6	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis 5 Sieve 1 11/2 11/2 3/8 #4 #8 #16 #30 #200 -#200 -#200 -#200 -#200 -#200 -#201 Total: Sieve V 11/2 1/2 3/8 #4 #8 #16	24.2 22.2.2 193.4 32.8 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent properties of the percent properties	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	814 88 816 830 850 8100 wesh  Total:  X Sieve  1 1/2 3/8 816 830 850 8100 8200 -200 wesh  1 1/2 1 1/2 3/8 84 88 816 830 850 850 850 850 850 850 850 850 850 85	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1233.6 1233.6 Weight ret each sieve 16.2 210 186.8 291.9 163.3 127.1 107.6 52.8 29.7 1.8 33.3	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve 1  1 1/2  1 1/2 3/8  #16 #30 #50 #100 #200 -#200 -#200 -#200 -#200 -#200 -100	24.2 227.2 193.4 328 194.6 121.6 94 45.5 1.9 30.9 1281.7	Percent pt 100,00% 38,11% 80,70% 48,00% 440,10% 24,91% 14,55% 2,56% 455% 2,56% 40,00% 82,25% 40,00% 82,25% 47,75%	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	FX Sieve 1 1/2 1 1/2 3/6 #16 #16 #16 #17 1 1/2 1 1/2 3/6 #16 #16 #17 1 1/2 1 1/2 3/6 #16 #16 #16 #16 #16 #16 #16 #16 #16 #1	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 31.2 1233.6 Weight ret each sieve 16.2 210 186.8 231.9 163.3 127.1 107.6 52.8 29.7 1.8	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 #4 #8 #16 #30 #30 #200 -#200 -#200 -#200 -#200 -#200 -#201 Total:  1 1/2 1 1/2 3/8 #4 #8 #16 #38 #16 #39	24.2 22.2 193.4 32.8 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent pt 96.11% 80.78% 65.53% 65	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	814 88 816 830 850 8100 wesh  Total:  X Sieve  1 1/2 3/8 816 830 850 8100 8200 -200 wesh  1 1/2 1 1/2 3/8 84 88 816 830 850 850 850 850 850 850 850 850 850 85	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1233.6 1233.6 Weight ret each sieve 16.2 210 186.8 291.9 163.3 127.1 107.6 52.8 29.7 1.8 33.3	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve   1 1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash  Total: Sieve   V   1 1/2 3/8 #4 #8 #16 #3 #4 #8 #16 #3 #16 #3 #4 #8 #16 #30	24.2 22.2.2 193.4 32.8 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent process of the service of th	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	814 88 816 830 850 8100 wesh  Total:  X Sieve  1 1/2 3/8 816 830 850 8100 8200 -200 wesh  1 1/2 1 1/2 3/8 84 88 816 830 850 850 850 850 850 850 850 850 850 85	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1233.6 1233.6 Weight ret each sieve 16.2 210 186.8 291.9 163.3 127.1 107.6 52.8 29.7 1.8 33.3	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—8 sssing size	correct gradeficn		11-01-8	on Analysis  Sieve 1  1 1/2  1 1/2  3/8  #4  #8  #16  #30  #200  -#200  -#200  -#200  -#200  -#200  -#200  -#200  -#200  -#200  #1 1/2  1 1/2  3/8  #4  #8  #16  #30  #30  #30  #30  #30  #30  #40  #30  #3	24.2 227.2 193.4 328 194.6 121.6 121.5 19.1 45.4 25.5 1.9 30.9 1281.7	Percent pt 96.11% 80.78% 65.53% 65	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	814 88 816 830 850 8100 wesh  Total:  X Sieve  1 1/2 3/8 816 830 850 8100 8200 -200 wesh  1 1/2 1 1/2 3/8 84 88 816 830 850 850 850 850 850 850 850 850 850 85	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1233.6 1233.6 Weight ret each sieve 16.2 210 186.8 291.9 163.3 127.1 107.6 52.8 29.7 1.8 33.3	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—E	correct gradeficn		11-01-8	on Analysis  Sieve   1 1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash  Total: Sieve   V 1 1/2 3/8 #16 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3	24.2 22.2.2.2.193.4 32.8 194.6 121.6 94 45.4 25.5 1.9 30.9 1281.7	Percent process of the service of th	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing
iradatio 1-01-95	814 88 816 830 850 8100 wesh  Total:  X Sieve  1 1/2 3/8 816 830 850 8100 8200 -200 wesh  1 1/2 1 1/2 3/8 84 88 816 830 850 850 850 850 850 850 850 850 850 85	11.3 239.3 168.2 324.3 184.9 115.7 90.2 43 24.2 1233.6 1233.6 Weight ret each sieve 16.2 210 186.8 291.9 163.3 127.1 107.6 52.8 29.7 1.8 33.3	Percent prescription (100.00% 29.05% 79.69% 66.05% 39.76% 24.77% 15.39% 4.60% 2.63% Lab # Percent prescription (100.00% 98.69% 43.18% 28.40% 18.15% 9.45% 5.22%	Rei—T essing este non-NCAT Rai—E	correct gradeficn		11-01-8	on Analysis 5 Sieve 1 11/2 1 1/2 3/8 #4 #8 #16 #30 #200 -#200 -#200 -#200 -#200 -#200 11/2 1 1/2 3/8 #4 #8 #16 #30 #30 #30 #30 #30 #30 #30 #30 #30 #30	24.2 227.2 193.4 328 194.6 121.6 121.5 19.1 45.4 25.5 1.9 30.9 1281.7	Percent process of the service of th	Rei-3  NESSING  Restze  NCAT  Rai-4  asssing

Total

1206.6

PAGOSA TROUT LAKES GRADATION COMPARISON USING THE NCAT OVEN
TABLE A REPRESENTS THE GRADATION OF THE AGGREGATE WITH NO ASPHALT ADDED TABLE B REPRESENTS THE GRADATION OF THE AGGREGATE AFTER ASPHALT WAS ADOED AND BURNT OFF INSIDE THE NCAT OVEN
TABLE
A
TABLE

A

TABLE PURE AGGREGATE
Lab # 827x-1 NCAT x 627144 Weight not: Percent passing each sieve each sieve pt ret Percent passing 1 1/2 1 1/2 3/6 64 68 816 630 630 6200 -6200 -200 w 100,00% 80,74% 73,50% 46,45% 33,20% 22,75% 16,00% 11,00% 7,57% 5,33% 1 1/2 1 100,00% 100,00% 75,65% 51,00% 36,76% 25,63% 18,29% 12,65% 8,56% 5,94% 305 314.3 153.3 122.2 77.4 50.1 40.8 26 3.4 56.6 1/2 3/8 64 616 630 650 6100 6200 -6200 -200 wa 291.6 291.6 168.4 131.7 86.9 86.7 48.1 31.3 2.3 68 Total 1162.2 Total 1183 24 Gradation 10-10-85 6271-2 MCAT 627a-S Gradation 10-10-85 100,80% 00,80% 76,80% 56,75% 41,27% 28,80% 21,25% 14,52% 8,64% 6,67% 1 1/2 1 1/2 3/6 6/4 6/30 6/30 6/30 6/200 -6/200 -2/200 100.80% 100.80% 74.34% 52.40% 25.35% 25.35% 16.28% 12.53% 8.34% 2.6 301.1 283.4 177.9 154 110.2 86.8 84.4 30.7 2.5 85 284,8 287,9 106 126,3 85,0 80,2 \$0,1 30,5 2,9 67,2 1202.7 Labe 627=4 1 1/2 1 1/2 3/8 6/4 6/50 6/50 6/50 6/50 -200 -200 -200 100,00% 90,46% 72,27% 47,85% 32,01% 22,27% 15,76% 10,56% 4,74% 1 1/2 1 1/2 3/8 64 65 650 650 650 6200 -2000 -2000 100,80% 100,80% 74,83% 50,46% 37,56% 27,87% 19,71% 13,81% 6,61% 6.9 341.8 312 204.6 125 83.5 66.2 46.5 28.6 4 302.9 206.5 153.7 125.6 87.9 70.4 62.2 33.8 2.3 76.6 1262.7 1183,8 NCAT Labe 1 1/2 1 1/2 3/8 64 68 616 630 650 6100 6200 -6200 -200 v 100.00% 99.79% 79.37% 56.00% 36.61% 27.73% 20.00% 13.62% 6.34% 2.6 254 290.8 216.3 135.4 96.2 79.4 58.5 32 1.2 77.7 Total: 1244,1

SA Lab # 627x.8 1 1/2 1 1/2 3/8 44 68 616 630 650 #100 #200 -#200 -200 w 100.00% 100.00% 75.03% 50.12% 34.20% 24.37% 17.49% 11.94% 7.99% 5.64% 310.2 309.5 197.7 122.2 85.4 69 49 29.2 1.1 69

Total:

1242.3

B-12

GRADATION COMPARISON USING THE NCAT OVEN
TABLE A REPRESENTS THE GRADATION OF THE AGGREGATE WITH NO ASPHALT ADDED

1299.6

# TABLE B REPRESENTS THE GRADATION OF THE AGGREGATE AFTER ASPHALT WAS ADDED AND BURNT OFF INSIDE THE MOAT OVEN

INDUE	B KEPKE	SENIS THE GRADAT	TION OF THE AGGR	EGATE AFTER ASPHALT WAS	ADDED AND BURNT OFF IN	SIDE THE N	CAT OVEN		
		TABLE A				TAI	BLE		
1A							3		
10-24-	95	AGGREGATE, I	UME ADDED	non-NCAT		1B NCAT 10-23-9	5		
	Sieve	Weight retained in	Percent passing each sieve stre			Sieve	Weight retained in	Percent passin	
	1 1/2		COCCI SIGNE STEE			440	each sleve	each sleve stze	
	1	_	100,00%			1 1/2 1			
	1/2 3/6	5 396	.1 99,59%			1/2		100.00 .1 <b>29</b> .45	
	84	396 312				3/6	336		
	#8	145				#4	300		
	#16	102	.3 22.43%			#8 #16	161.	-	
	#30 #50	87.				#16	104.		
	#100	69. 44.				#50	83. 70.		
	#200	29				, #100	48.		
	-#200		4			#200	32.	8 4.53	
	-200 we	sh 42.	.9			-#200 -200 was	2. h 51.		
	Total	1239.	7			Total	1198	5	
<b>2A</b>						Gradatio	n Analysis		
		AGGREGATE, LI	ME ADDED			10-23-05	28	Lab #	500±-2
Gradeti	or X	ASSESSAIE, U	ME ADDED	non-NCAT 598x-6		Sieve	Weight retained in	Percent passing	
10-24-0	Sieve	Modeland		3903-0		11/2	each sieve	each sleve stre	
	OHEVE	Weight retained in each slove	Percent passing each sleve size		•	1		100,009	ĸ
	11/2		4401 Serie 222			1/2	7.2	2 \$9,411	
	1_		100.00%			36 #4	365,6		
	1/2 3/6		100.00%			#4 #8	299.7 138.9		
	#4 .	373.0 323				#16	107.7		
	#8	133.6				#30	91.8		
	#16	94.2	26,36%			#50 #100	73.6	******	
	#30 #50	91.9	10.01.0			#200	46.3 32		
	#100	82.8 57.4				-#200	23		•
	#200	38.6				-200 west			
	-#200 -200 west	3.6	1			Totat	1222.9		
	-200 04.0	h 56.5							
	T-4-6								
	Total	1255.6	:			Gradetion	Analysis	Lab#	590s-3
	Total	1255.6	;			10-23-05			590s-3
	Total	1255.6	•			10-23- <b>0</b> 5 Sieve	Analysis	Lab # Percent passing each slove stre	500s-3
3-A	Totat		non-NCAT			10-23-05 Sieve 1 1/2	Analysis Weight retained in	Percent pessing each slove size	
3-A Gradatio		1255.6	non-HCAT IE ADDED	to. T		10-23-05 Sieve 1 1/2 1 1/2	Analysis Weight retained in	Percent pessing each slove size	
	rX	AGGREGATE, LIM	non-HCAT IE ADDED	59 <b>0</b> x-7		10-23-65 Sieve 1 1/2 1 1/2 3/6	Analysis Weight retained in each sleve  3.4 363.6	Percent pessing each slove size 100.00% 99.73% 70.47%	
Gradation	rX	AGGREGATE, LIN	non-NCAT IE ADDED Lab # 5	<del>59</del> 0₄-7		10-23-65 Sieve 1 1/2 1 1/2 3/6 8/4	Analysis Weight retained in each sieve  3.4 363,6 302.3	Percent pessing each slove size 100,00% 99,73% 70,47% 46,14%	
Gradation	rX Sleve	AGGREGATE, LIM	non-NCAT IE ADDED Lab # (	590x-7		10-23-65 Sieve 1 1/2 1 1/2 3/6	Analysis Weight retained in each sleve 3.4 363.6 302.3 154.3	Percent pessing each slove size 100.00% 99.73% 70.47% 46.14% 33.72%	
Gradation	CX Sieve 1 1/2 1	AGGREGATE, LIN	non-HCAT IE ADDED Lab 8 9 Percent pessing each sieve size	590x-7		10-23-05 Sieve 1 1/2 1 1/2 3/6 #4 #8 #16 #30	Analysis Weight retained in each sieve  3.4 363,6 302.3	Percent pessing each slove size 100,00% 99,73% 70,47% 46,14%	
Gradation	FX Sieve 1 1/2 1 1/2	AGGREGATE, LIN Weight retained in each sleve	non-NCAT UE ADDED Lab # : Percent pessing each sieve size 100.00%	590x-7		10-23-05 Sieve 1 1/2 1 1/2 3/6 6/4 8/8 8/16 6/30 8/50	Analysis Weight retained in each sleve 3.4 363,6 302,3 1154,3 115 95,6 74	Percent pessing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,02%	
Gradation	rX Sieve 1 1/2 1 1/2 3/8	AGGREGATE, LIM Weight retained in each slove	non-NCAT IE ADDED Lab #	59 <b>0</b> 4-7		10-23-05 Sieve 1 1/2 1 1/2 3/6 #4 #8 #16 #30 #50 #100	3.4 Analysis Weight retained in each sieve 3.4 363,6 302,3 154,3 115 95,6 74 47,7	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98%	
Gradation	FX Sieve 1 1/2 1 1/2	AGGREGATE, LIN Weight retained in each sleve	non-HCAT IE ADDED Lab # Percent pessing each sieve size 100.00%, 100.00%, 69.59%, 44.26%,	<b>590</b> 4-7		10-23-85 Sieve 11/2 1 1/2 1 1/2 1 1/2 1 1/2 1 84 488 #16 430 #50 #100 #200 -#200	Analysis Weight retained in each sleve 3.4 363,6 302,3 1154,3 115 95,6 74	Percent pessing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,02%	
Gradation	FX Sieve 1 1/2 1 1/2 3/8 84 88 816	AGGREGATE, Linu Weight retained in each sleve 391.1 325.7 160.1 111.7	non-NCAT IE ADDED Lab #	<del>59</del> 6⊮7		1 1/2 1 1/2 1 1/2 3/8 #4 #8 #16 #30 #50 #100 #200	Analysis  Weight retained in each sieve  3.4 363,6 302.3 154.3 115 95,6 74 47.7 32.3	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98%	
Gradation	Sieve 1 1/2 1 1/2 3/8 84 816 830	AGGREGATE, LIM Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4	non-HCAT IE ADDED Lab #	<b>59</b> 0x-7		10-23-05 Sieve 1 1/2 1 1/2 3/6 84 816 830 850 850 87100 8200 8200 8200 8200	Analysis  Weight retained in each sieve  3.4 363,6 302.3 154.3 115 95,6 74 47.7 32.3 4,6 49.8	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98%	
Gradation	rX Sleve 1 1/2 1 1/2 3/8 8/4 8/8 8/16 6/30 8/50	AGGREGATE, Like Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2	Bon-NCAT Lab #	<b>590</b> 4-7		10-23-85 Sieve 11/2 1 1/2 1 1/2 1 1/2 1 1/2 1 84 488 #16 430 #50 #100 #200 -#200	3.4 Analysis Weight retained in each sieve 3.4 363,6 302.3 1154.3 115 95,6 74 47,7 32.3 4,6	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98%	
Gradation	Sieve 1 1/2 1 1/2 3/8 84 816 830	AGGREGATE, Life Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2	non-NCAT WE ADDED Lab #	59 <b>0</b> x-7		10-23-05 Sieve 1 1/2 1 1/2 3/6 84 816 830 850 850 87100 8200 8200 8200 8200	Analysis  Weight retained in each sieve  3.4 363,6 302.3 154.3 115 95,6 74 47.7 32.3 4,6 49.8	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98%	
Gradation	rX Sleve 1 1/2 1 1 1/2 3/8 84 83 816 830 850 \$100 \$200 -#200	AGGREGATE , LBu Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1	Bon-NCAT Lab #	596x-7		10-23-95 Sieve 1 1/2 1 1/2 3-8 84 86 816 850 8100 8200 -200 wash Total	3.4 363.6 3023.1155.95.6 74.47.7 32.3 4.6 49.8	Percent pessing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,36%	
Gradation	FX Sleve 1 1/2 1 1/2 3/8 8/4 8/8 8/16 8/30 8/50 8/50 8/200	AGGREGATE , LIM Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 77.2 47 32.1 4.1	non-NCAT WE ADDED Lab #	59 <b>0</b> 1-7		10-23-95 Slave 1 1/2 1 1/2 3/6 8/4 8/5 8/16 8/50 8/100 8/200 -200 wash Totat	3.4 363.6 3023.1155.95.6 74.47.7 32.3 4.6 49.8	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98%	
Gradatio 10-24-85	rX Sleve 1 1/2 1 1 1/2 3/8 84 83 816 830 850 \$100 \$200 -#200	AGGREGATE , LIM Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6	non-NCAT WE ADDED Lab #	<del>59</del> 6⊮-7		10-23-95 Sieve 1 1/2 1 1/2 3/6 #4 #6 #16 #30 #50 #100 -#200 -200 wash Totat	Analysis  Weight retained in each sieve  3.4 363.6 302.3 154.3 115 95.6 74 47.7 32.3 4.6 49.8 1242.6  Analysis	Percent pessing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,36%	
Gradatio: 10-24-85	FX Sleve 1 1/2 1 1/2 38 84 88 616 630 650 650 6200 -6200 -200 wesh	AGGREGATE , LBu Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1	non-NCAT WE ADDED Lab #	<b>59</b> 9≥-7		10-23-95 Sieve 1 1/2 1 1 1/2 3/6 4/4 4/8 8/16 6/30 8/30 8/200 -#200 -#200 -#200 wash Total	Analysis  Weight retained in each sieve  3.4 363,6 302,3 154,3 115 95,6 74 47,7 32,3 4,6 49,8 1242,6  Analysis	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%	
Gradatio 10-24-85	FX Sleve 1 1/2 1 1/2 38 84 88 616 630 650 650 6200 -6200 -200 wesh	AGGREGATE , LIM Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6	non-NCAT IE ADDED Lab #	<b>390</b> 2-7		10-23-95 Sieve 1 1/2 1 1/2 3-6 48 85 816 630 850 8100 8200 -200 wash Totat Gradation 10-23-95 Sieve 1	Analysis  Weight retained in each sieve  3.4 363,6 302,3 154,3 115 95,6 74 47,7 32,3 4,6 49,8 1242,6  Analysis	Percent passing each sieve size  100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sieve size	
Gradatio: 10-24-85	FX Sleve 1 1/2 1 1/2 38 84 88 616 630 650 650 6200 -6200 -200 wesh	AGGREGATE , Lift Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6	non-NCAT  EADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 69.59% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%	<b>590</b> 4-7		10-23-95 Sieve 1 1/2 1 1 1/2 3/6 4/4 4/8 8/16 6/30 8/30 8/200 -#200 -#200 -#200 wash Total	Analysis  Weight retained in each sieve  3.4 363,6 302,3 154,3 115 95,6 74 47,7 32,3 4,6 49,8 1242,6  Analysis	Percent passing each sleve size  100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab # Percent passing each sleve size  100,00%	
Gradation 10-24-85	FX Sieve 1 1/2 1 1/2 1 1/2 3/8 84 88 84 88 816 830 850 8200 8200 8200 7200 7200 7200 7200 720	AGGREGATE , LIM Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE , LIMI	non-NCAT EADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%			10-23-95 Sieve 1 1/2 1 1/2 3/8 8/8 8/16 6/30 8/50 8/50 8/700 -2/200 wash Total: Cradation 10-23-95 Sieve 1 1/2 1 1/2 3/8	a Analysis  Weight retained in each sieve  3.4 363,6 302,3 115,95,6 74 47,7 32,3 4,6 49,8 1242,6  Analysis  Weight retained in each sieve	Percent passing each sieve size  100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sieve size	
Gradation 10-24-85 4-A Gradation 10-24-95	FX Sieve 1 1/2 1 1/2 3/8 84 816 830 8100 8200 -200 wesh Totat X	AGGREGATE , Little Weight retained in each slove 391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286	non-NCAT LEADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 69.59% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%	<b>596</b> ⊮-7		10-23-95 Sieve 1 1/2 1 1/2 3/8 #4 #6 #6 #50 #100 -200 wash Total: Gradation 10-23-95 Sieve 1 1 1/2 1 1/2 1 1/2 3/8 #4	a Analysis  Weight retained in each sieve  3.4 363.6 302.3 154.3 115 95.6 74 47.7 32.3 4.6 49.8 1242.6  Analysis  Weight retained in each sieve	Percent pessing each sieve size  100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent pessing each sieve size  100,00% 70,66% 45,83%	
Gradation 10-24-85 4-A Gradation 10-24-95	FX Sieve 11/2 1 1/2 1 1/2 3/8 84 88 84 88 816 830 850 8200 8200 8200 7000 7000 Totat  X Sieve	Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE LIMI	non-NCAT LE ADDED Lab #  Percent pessing each sieve size  100.00%, 100.00%, 44.26%, 31.81%, 23.13%, 16.02%, 10.40%, 4.25%, 4.25%,  non-NCAT E ADDED Lab #  Si Percent passing			10-23-85 Sieve 1 1/2 1 1/2 3-8 64 48 816 630 850 8100 8200 -	3.4 Analysis  Weight retained in each sieve  3.4 363,6 302.3 1154.3 115 95.6 74 47.7 32.3 4.6 49.8 1242.6  Analysis  Weight retained in each sieve	Percent passing each sleve size  100,00% 99,73% 70,47% 46,14% 33,72% 24,45% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 70,65% 45,83% 34,17%	
Gradation 10-24-85 4-A Gradation 10-24-95	FX Sieve 11/2 1 1/2 1 1/2 3/8 84 88 84 88 816 830 850 8200 8200 8200 7000 7000 Totat  X Sieve	Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE LIMI	non-NCAT LEADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 69.59% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%			10-23-95 Sieve 1 1/2 1 1 1/2 3/6 4/4 4/8 8/16 6/30 8/30 8/200 -#200 -#200 -#200 -#200 wash Total: 1 1/2 3/8 1 1/2 3/8 1 1/2 1 1/2 3/8 8 1/8 8 1/8 1 1/2 1 1/2 3/8 8 1/8 8 1/8	a Analysis  Weight retained in each sieve  3.4 363.6 302.3 154.3 115 95.6 74 47.7 32.3 4.6 49.8 1242.6  Analysis  Weight retained in each sieve	Percent passing each slove size 100,00% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38% Lab # Percent passing each sleve size 100,00% 70,66% 45,83% 34,17% 25,63%	
Gradation 10-24-85 4-A Gradation 10-24-85	FX Sieve 11/2 1 1/2 1 1/2 1 1/2 3/8 84 88 84 88 816 830 850 8200 8200 8200 8200 7000 8200 8200 820	Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE LIMI	non-NCAT LADGED Lab#  Percent pessing each sieve size  100.00% 100.00% 69.59% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%  Trion-NCAT E ADDED Lab# 5:  Percent passing each sieve size			10-23-95 Sieve 1 1/2 1 1/2 3-6 44 48 630 450 4500 47200 -7200 wash Total: 1 1/2 1 1/2 3/8 44 88 #16 #30 #50	3.4 Analysis  Weight retained in each sieve  3.4 363,6 302.3 1154.3 115 95.6 74 47.7 32.3 4.6 49.8 1242.6  Analysis  Neight retained in each sieve  370.1 313.1 147.1 107 95.6 79.2	Percent passing each sleve size  100,00% 99,73% 70,47% 46,14% 33,72% 24,45% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83%	
Gradation 10-24-85 4-A Gradation 10-24-95	FX Sieve 1 1/2 1 1/2 3/8 84 856 816 830 8100 8200 -200 wash Totat X Sieve 1 1/2 1 1/2	AGGREGATE Like Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE LIke Weight retained in each sleve  3.6	non-NCAT LE ADDED Lab #  Percent pessing each sieve size  100.00%, 100.00%, 44.26%, 31.81%, 23.13%, 16.02%, 10.40%, 4.25%, 4.25%,  non-NCAT E ADDED Lab #  Si Percent passing			10-23-95 Sieve 1 1/2 1 1/2 3/6 #56 #160 #500 #7000 -7200 wash Total: 1 1/2 1 1	3.4. 363.6 3023.115.95.6 74.47.7 32.3 4.6 49.8 1242.6 Analysis Weight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	
Gradation 10-24-85 4-A Gradation 10-24-95	rX Sieve 1 1/2 1 1/2 1 1/2 3/8 84 816 830 8100 8200 -200 wash Totat X Sieve 1 1/2 1 1/2 3/8	Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE, LIMI Weight retained in each sieve	non-NCAT LE ADDED Lab #  Percent pessing each sieve size  100.00% 69.59% 44.26% 31.81% 23.13% 16.02% 10.40% 67.75% 4.25%  Percent pessing each sieve size  100.00% 99.72% 71.11%			10-23-95 Sieve 1 1/2 1 1/2 3-6 44 48 630 450 4500 47200 -7200 wash Total: 1 1/2 1 1/2 3/8 44 88 #16 #30 #50	Analysis  Weight retained in each sieve  3.4 363,6 302.3 1154.3 115 95.6 74 47.7 32.3 4.6 49.8 1242.6  Analysis  Neight retained in each sieve  370.1 107 95.6 79.2 53.5	Percent passing each sleve size  100,00% 99,73% 70,47% 46,14% 33,72% 24,45% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83%	
Gradation 10-24-85	FX Sieve 11/2 1 1/2 1 1/2 1 1/2 3/8 84 88 816 830 850 8200 8200 8200 7200 wash Total:  X Sieve 1 1/2 1 1/2 1 1/2 3/8	AGGREGATE, Like Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE, Like Weight retained in each sieve  3.6 371.8 307.5	non-NCAT IE ADDED Lab #  Percent pessing each sleve size  100.00%, 100.00%, 44.26%, 31.81%, 16.02%, 10.40%, 4.25%, 4.25%  non-NCAT E ADDED Lab #  Percent passing each sleve size  100.00%, 99.72%, 71.11%, 47.45%			10-23-95 Sieve 11/2 11/2 38 #4 #8 #16 #30 #50 #200200 wash Total: 11/2 11/2 3/8 #16 #203 #300 #300 #300 #300 #300 #300 #300	3.4. 363.6 3023.115.95.6 74.47.7 32.3 4.6 49.8 1242.6 Analysis Weight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	
Gradatior 10-24-85 4-A Gradatior 10-24-95	FX Sieve 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 3/8 84 88 84 88 64 850 8500 8500 8200 -200 wash Totat  X Sieve 1 1/2 1 1/2 3/8 84 88 8416	Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE, LIMI Weight retained in each sieve	non-NCAT EADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%  non-NCAT EADDED Lab #  5: Percent passing each sieve size  100.00% 99.72% 71.11% 47.45% 35.91%			10-23-95 Sieve 1 1/2 38 84 88 816 630 850 850 8700 -7200 -7200 -7200 -7200 -7200 11/2 11/2 3/8 816 830 850 8100 8700 8700 -7200	3.4. 363.6. 302.3. 1154.3. 1155 95.6. 74 47.7. 32.3. 4.6. 49.8. 1242.6. Analysis Neight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	
Gradatior 10-24-85	r X Sieve 1 1/2 1 1/2 1 1/2 1 1/2 3/8 84 88 816 830 8200 -8200 -8200 -200 wash Totat X Sieve 1 1/2 1	AGGREGATE , LIM Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE , LIMI Weight retained in each sleve  3.6 371.8 307.5 150 116.6	non-NCAT IE ADDED Lab #  Percent pessing each sleve size  100.00%, 100.00%, 44.26%, 31.81%, 16.02%, 10.40%, 4.25%, 4.25%  non-NCAT E ADDED Lab #  Percent passing each sleve size  100.00%, 99.72%, 71.11%, 47.45%			10-23-95 Sieve 1 1/2 1 1/2 3/6 8/6 8/50 8/50 8/50 8/50 8/50 8/50 8/50 8/50	3.4 363,6 302,3 154,3 115 95,6 74 47,7 32,3 4,6 49,8 1242,6 Analysis Weight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	
Gradation 10-24-85	FX Sieve 1 1/2 1 1/2 1 1/2 3/8 84 88 816 830 8100 8200 -200 wash Totat X Sieve 1 1/2 1 1 1/2 3/8 84 88 816 8130 850	AGGREGATE , List Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE , Listi Weight retained in each sleve  3.6 371.8 307.5 150 116.6 106.1 88.1	non-NCAT EADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 100.00% 42.6% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%  10.40% 6.75% 4.25%  Percent passing each sieve size  100.00% 99.72% 71.11% 47.45% 35.91% 26.94% 18.76% 12.00%			10-23-95 Sieve 1 1/2 38 84 88 816 630 850 850 8700 -7200 -7200 -7200 -7200 -7200 11/2 11/2 3/8 816 830 850 8100 8700 8700 -7200	3.4. 363.6. 302.3. 1154.3. 1155 95.6. 74 47.7. 32.3. 4.6. 49.8. 1242.6. Analysis Neight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	
Gradation 10-24-85	r X Sieve 1 1/2 1 1/2 1 1/2 1 1/2 3/8 84 88 816 830 8200 -8200 -8200 -200 wash Totat X Sieve 1 1/2 1	AGGREGATE , LIM Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE , LIMI Weight retained in each sleve  3.6 371.8 307.5 150 116.6 106.1 88.1	non-NCAT EADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%  non-NCAT EADDED Lab #  50 Percent pessing each sieve size  100.00% 99.72% 71.11% 47.45% 35.91% 26.94% 18.78% 12.00% 7.58%			10-23-95 Sieve 1 1/2 38 84 88 816 630 850 850 8700 -7200 -7200 -7200 -7200 -7200 11/2 11/2 3/8 816 830 850 8100 8700 8700 -7200	3.4. 363.6. 302.3. 1154.3. 1155 95.6. 74 47.7. 32.3. 4.6. 49.8. 1242.6. Analysis Neight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	
4-A Gradatior 10-24-85	rX Sieve 1 1/2 1 1/2 1 1/2 3/8 84 816 830 816 830 8100 8200 -200 wash Totat X Sieve 1 1/2 1 1/2 3/8 84 88 816 830 8400 8400 8400 8400 8400	AGGREGATE , List Weight retained in each sieve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE , List Weight retained in each sieve  3.6 371.8 307.5 150 116.6 106.1 88.1 57.4 37.5 3.6	non-NCAT EADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 100.00% 42.6% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%  10.40% 6.75% 4.25%  Percent passing each sieve size  100.00% 99.72% 71.11% 47.45% 35.91% 26.94% 18.76% 12.00%		D_12	10-23-95 Sieve 1 1/2 38 84 88 816 630 850 850 8700 -7200 -7200 -7200 -7200 -7200 11/2 11/2 3/8 816 830 850 8100 8700 8700 -7200	3.4. 363.6. 302.3. 1154.3. 1155 95.6. 74 47.7. 32.3. 4.6. 49.8. 1242.6. Analysis Neight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	
4-A Gradatior 10-24-85	r X Sieve 1 1/2 1 1/2 1 1/2 3/8 8/4 8/8 8/16 8/30 8/200 -#/200 -#/200 -200 wash Totat X Sieve 1 1/2 1 1/2 3/8 8/8 8/8 8/8 8/8 8/8 8/8 8/8 8/8 8/8	AGGREGATE , Like Weight retained in each sleve  391.1 325.7 160.1 111.7 91.4 72.2 47 32.1 4.1 50.6 1286  AGGREGATE , Like Weight retained in each sleve  3.6 371.8 307.5 150 116.6 106.1 88.1 57.4 37.5	non-NCAT EADDED Lab #  Percent pessing each sieve size  100.00% 100.00% 44.26% 31.81% 23.13% 16.02% 10.40% 6.75% 4.25%  non-NCAT EADDED Lab #  50 Percent pessing each sieve size  100.00% 99.72% 71.11% 47.45% 35.91% 26.94% 18.78% 12.00% 7.58%		B-13	10-23-95 Sieve 1 1/2 38 84 88 816 630 850 850 8700 -7200 -7200 -7200 -7200 -7200 11/2 11/2 3/8 816 830 850 8100 8700 8700 -7200	3.4. 363.6. 302.3. 1154.3. 1155 95.6. 74 47.7. 32.3. 4.6. 49.8. 1242.6. Analysis Neight retained in each sieve	Percent passing each slove size  100,000% 99,73% 70,47% 46,14% 33,72% 24,46% 16,77% 10,82% 6,98% 4,38%  Lab #  Percent passing each sleve size  100,00% 100,00% 100,00% 70,66% 45,83% 34,17% 25,69% 18,11% 11,83% 7,59%	

# IRWIN/WINSOR/STUTE P 647x MIX

GRADATION COMPARISON USING THE NCAT OVEN TABLE A REPRESENTS THE GRADATION OF THE AGGREGATE WITH NO ASPHALT ADDED

TABLE B REPRESENTS THE GRADATION OF THE AGGREGATE AFTER ASPHALT WAS ADDED AND BURNT OFF INSIDE THE  $\hbar$ 

TABLE	

NON-NCAT				
-5			NGAT -1	
			-1	
			1/2	2.9 99.78%
			3/8	258.7 79.98%
			#4	278.8 58.65%
1/2		100.00%	#8	184.9 44.50%
3/8	246.5	80,67%	#16 #30	140.3 33.76%
#4 #8	263.9	59.97%	#50	122.1 24.42% 112.8 15,79%
#16	216.2	43.01%	#100	79.1 9.73%
#30	145.4 120.6	31.60% 22.14%	#200	47.5 6.10%
#50	105.3	13.88%	-#200 -200 wash	6.4 73.3
#100 #200	71.3	8.29%	200	73.3
-#200	<b>42.</b> 1 10.8	4.99%	Total:	1306.8
-200 wash	52.8			
Total:	1274.9			
-6			-2	
1/2	. 4	99.70%		
3/8	243.2	81.64%	1/2 3/8	6.4 99.45% 199.7 82.21%
#4 #8	287.8	60.27%	#4	199.7 82.21% 255.9 60,11%
#16	217.1 166.1	44.14% 31.81%	#8	202.3 42.64%
#30	131.7	22.03%	#16 #30	145.8 30.06%
#50	109.4	13.90%	#50 #50	107.2 20.80% 86.1 13.37%
#100 #200	71.8	8.57%	#100	56.7 8.47%
<b>4</b> 7200	<b>4</b> 1.5 6.1	5.49%	#200	33.3 5.59%
-200 wash	67.8		-#200 -200 wesh	4.1 60.7
Total:	1346.5		Total;	1158.2
_			_	
-7	?		3	
-7 1/2	?	100.004		
1/2 3/8	? 276.7	100.00% 75.87%	1/2	100.00%
1/2 3/8 #4	276.7 220.5	100.00% 75.87% 56.65%		273.2 78.89%
1/2 3/8 #4 #8	276.7 220.5 166.1	75.87% 56.65% 42.17%	1/2 3/8	
1/2 3/8 #4	276.7 220.5 166.1 137.3	75.87% 56.65% 42.17% 30.19%	1/2 3/8 #4 #8 #16	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01%
1/2 3/8 #4 #8 #16 #30 #50	276.7 220.5 166.1	75.87% 56.65% 42.17%	1/2 3/8 #4 #8 #16 #30	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76%
1/2 3/8 #4 #8 #16 #30 #50	276.7 220.5 166.1 137.3 114.9 90 55.8	75.87% 56.65% 42.17% 30.19% 20.18% 12.33% 7.46%	1/2 3/8 #4 #8 #16 #30 #50	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02%
1/2 3/8 #4 #8 #16 #30 #50 #100	276.7 220.5 166.1 137.3 114.9 90 55.8 32	75.87% 56.65% 42.17% 30.19% 20.18% 12.33%	1/2 3/8 #4 #8 #16 #30 #50 #100	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76%
1/2 3/8 #4 #8 #16 #30 #50	276.7 220.5 166.1 137.3 114.9 90 55.8	75.87% 56.65% 42.17% 30.19% 20.18% 12.33% 7.46%	1/2 3/8 #4 #8 #16 #30 #50	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76%
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -#200	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5	75.87% 56.65% 42.17% 30.19% 20.18% 12.33% 7.46%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -#200 -200 wash	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1	75.87% 56.65% 42.17% 30.19% 20.18% 12.33% 7.46%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total:	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1	75.87% 56.65% 42.17% 30.19% 20.18% 12.33% 7.46% 4.67%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total:	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9	75.87% 56.65% 42.17% 30.19% 20.18% 12.33% 7.46% 4.67% 99.40% 80.37%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -#200 -200 wash	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total:	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9	75.87% 55.65% 42.17% 30.18% 20.18% 12.33% 7.46% 4.67% 99.40% 80.37% 60.86%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7 1294.3
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total: -8 1/2 3/8 #4 #8 #16	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9	75.87% 56.65% 42.17% 30.19% 20.18% 12.33% 7.46% 4.67% 99.40% 80.37% 60.86% 44.82%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -4200 -200 wash Total -4 1/2 3/8 #4 #8	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7 1294.3 100.00% 253.7 79.60% 234.2 60.78% 188.4 45.63%
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total: -8  1/2 3/8 #4 #8 #16 #30	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9 7.6 242.5 248.6 204.3 146.6 125	75.87% 55.65% 42.17% 30.18% 20.18% 12.33% 7.46% 4.67% 99.40% 80.37% 60.86%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total -4 1/2 3/8 #4 #8 #16	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7 1294.3 100.00% 253.7 79.60% 234.2 60.78% 188.4 45.63% 150.5 33.53%
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -#200 -200 wash Total: -8  1/2 3/8 #4 #8 #16 #30 #50	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9 7.6 242.5 248.6 204.3 146.6 125 112.1	75.87% 56.65% 42.17% 30.18% 12.33% 7.46% 4.67% 99.40% 80.37% 60.86% 44.82% 33.32% 23.51% 14.71%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -4200 -200 wash Total -4 1/2 3/8 #4 #8	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7 1294.3 100.00% 253.7 79.60% 234.2 60.78% 188.4 45.63% 150.5 33.53% 122.2 23.71%
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total: -8  1/2 3/8 #4 #8 #16 #30	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9 7.6 242.5 248.6 204.3 146.6 125 112.1 75	75.87% 56.65% 42.17% 30.18% 12.33% 7.46% 4.67% 99.40% 80.37% 60.86% 44.82% 33.32% 23.51% 14.71% 8.82%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash  Total  1/2 3/8 #4 #8 #16 #30 #50 #100	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7  1294.3  100.00% 253.7 79.60% 234.2 60.78% 188.4 45.63% 150.5 33.53% 122.2 23.71% 104.1 15.34% 70.6 9.66%
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash  Total: -8  1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -#200	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9 7.6 242.5 248.6 204.3 146.6 125 112.1	75.87% 56.65% 42.17% 30.18% 12.33% 7.46% 4.67% 99.40% 80.37% 60.86% 44.82% 33.32% 23.51% 14.71%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash Total -4 1/2 3/8 #4 #8 #16 #30 #50 #100 #200	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7 1294.3  100.00% 253.7 79.60% 234.2 60.78% 188.4 45.63% 150.5 33.53% 122.2 23.71% 104.1 15.34% 70.6 9.66% 42.5 6.25%
1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash  Total: -8  1/2 3/8 #4 #8 #16 #30 #50 #100 #200	276.7 220.5 166.1 137.3 114.9 90 55.8 32 7.5 46.1 1146.9 7.6 242.5 248.6 204.3 146.6 125 112.1 75 44.3	75.87% 56.65% 42.17% 30.18% 12.33% 7.46% 4.67% 99.40% 80.37% 60.86% 44.82% 33.32% 23.51% 14.71% 8.82%	1/2 3/8 #4 #8 #16 #30 #50 #100 #200 -200 wash  Total  -4  1/2 3/8 #4 #8 #16 #30 #50 #100	273.2 78.89% 263.9 58.50% 202.3 42.87% 153.6 31.01% 119.6 21.76% 100.3 14.02% 68 8.76% 41.1 5.59% 5.6 66.7  1294.3  100.00% 253.7 79.60% 234.2 60.78% 188.4 45.63% 150.5 33.53% 122.2 23.71% 104.1 15.34% 70.6 9.66%

B-14

## VALCO/ROCKY MOUNTAIN

688x Mix

GRADATION COMPARISON USING THE NCAT OVEN TABLE A REPRESENTS THE GRADATION OF THE AGGREGATE WITH NO ASPHALT ADDED

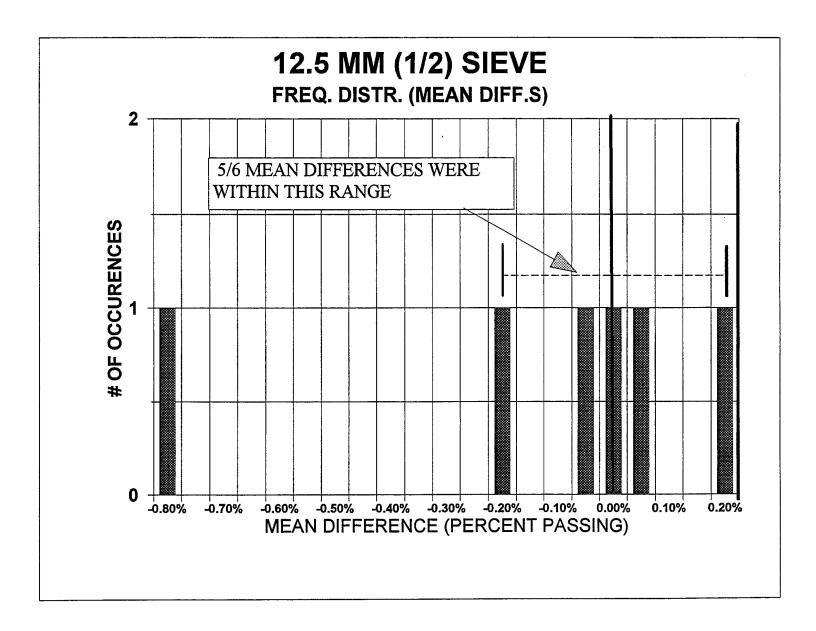
TABLE

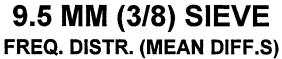
TABLE B REPRESENTS THE GRADATION OF THE AGGREGATE AFTER ASPHALT WAS ADDED AND BURNT OFF INSIDE THE NOAT OVEN

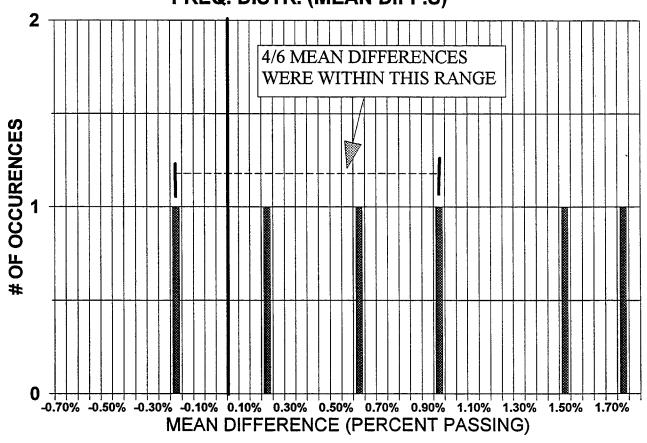
	TAE					TABLE	
		l	TABI	LE		B	
			8			6	
NON-NC	AT						
11011710	~•		NCAT			NCAT	
-5							
•							
			-1				
			•				
1/2		400 000					
		100.00%	1/2		100.00%		100.00%
3/8		75.67%	3/8	349.5		349.5	
#4	171.1	61.68%	#4	144.4			
#8	200.1	45.32%	<b>#8</b>	204.5		144.4	60.00%
#16	119.6	35.54%				204.5	43,43%
#30	110.7		#16	126.9		126.9	33.15%
#50	176.6		#30	110.2		110.2	24.23%
£100	86.2		#50	159.7	11.29%	159.7	11.29%
#200			#100	79.4	4.86%	79.4	4.86%
	27.1		#200	26.1	2.75%	26.1	2.75%
<b>-#200</b>	27		<b>-#200</b>	3.1		3.1	2.738
-200 west	31.3		-200 wash				
			-acc mest	JU.0		30.8	
Total:	1222.9		****	4004-			
			Total:	1234.6		1234.6	
-6			-2				
			- •				
1/2	5.9	99.51%	1/2		00 000		
3/8	311	73.90%		4.8		4.8	<b>9</b> 9.62%
84	179.7	59.11%	3/8	340.5	72.94%	340.5	72.94%
#8			#4	157.9	60.56%	157,9	60.56%
	192	43.30%	. #8	187.7	45.85%	187.7	45.85%
#16	122.6	33.20%	#16	120,6	36.40%	120.6	36.40%
#30	109.2	24.21%	#30	117.5	27.19%		
#50	1623	10.84%	#50	185.9		117.5	27,19%
<b>#10</b> 0	77.2	4.49%			12.62%	185.9	12.62%
#200	23.6	254%	#100	93.9	5.26%	<b>93.</b> 9	5.26%
<b>-#200</b>		234	#200	30.7	2.85%	30.7	2.85%
	24		<b>-#200</b>	3.9		3.9	
-200 west	26.5		-200 wash	32.5		32.5	
						420	
Total	1214.4		Total:	1275.9		1275.9	
						1213.5	
<b>-7</b>			•				
•			-3				
1/2	_						
	3		1/2	5.3	89.55%	5.3	89.55%
3/8	307.5	75.41%	<b>3/</b> 8	285.5	75.29%	285.5	75.29%
#4	174.9	61.56%	#4	175.9	60,34%	175.9	
#8	198.3	45.86%	#8	184.9	44.62%		60.34%
#16	114.5	36.79%	#16			184.9	44.62%
#30	115.1	27.68%		120.8	34,36%	120.8	34.36%
#50	190.6	12.58%	#30	109.8	25.03%	109.8	25.03%
#100	92.1	5.29%	#50	160.5	11.39%	160.5	11,39%
			#100	77.4	4.81%	77.4	4.81%
#200	26.5	3.03%	#200	24.2	2.75%	24.2	2.75%
<b>-#200</b>	1.9		<b>-#200</b>	2.2		22	
-200 wash	36.4		-200 wash	30.2		30.2	
						30.2	
Total:	1262.8		Total:	11767			
			rotal.	1176.7		1176.7	
_			-4				
<b>-8</b>							
			1/2		100 004		
1/2		100.00%			100.00%		100.00%
3/8	358.3	72.81%	3/8	303.9	76.69%	303.9	76.69%
#4			#4	155.4	64.77%	155.4	64.77%
	167.1	60.13%	#8	216.9	48.14%	216.9	48.14%
#8	207.7	44.37%	#16	147.4	36.83%	147.4	36.83%
#16	123.5	35.00%	#30	130.8	26.80%	130.8	
#30	122.4	25.71%	#50	191.3	12.13%		26.80%
#50	188.2	11.43%	#100	91.6	5.10%	191.3	12.13%
#100	89.8	4.61%				91.6	5.10%
#200	27	2.56%	#200	30	2.80%	30	2.80%
<b>-#20</b> 0	3.1	2.0076	<b>-#200</b>	3.9		3.9	
-200 wash			-200 wash	32.6		32.6	
-200 wash	30.7						
T-4 *	444		Total:	1303.8		1303,8	
Total:	1317.8						

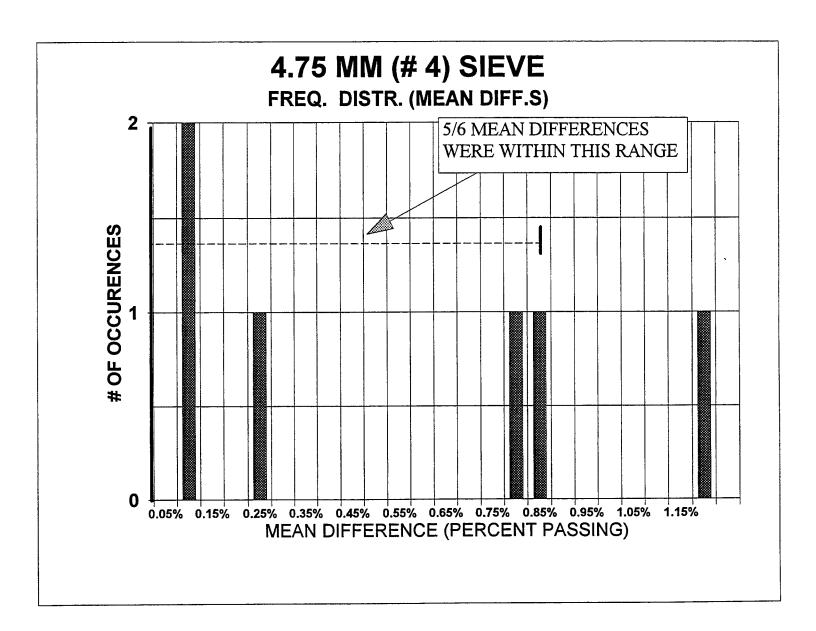
# APPENDIX C

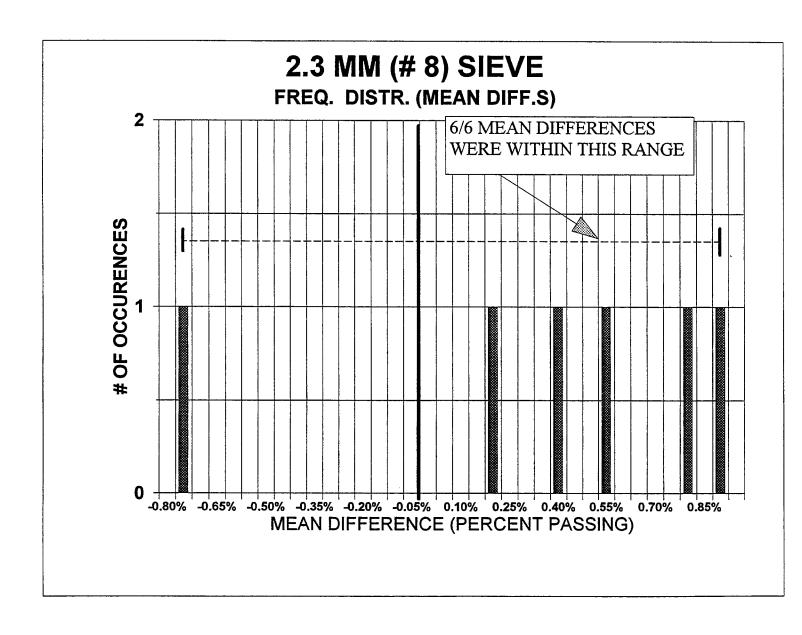
\* Frequency Figures for Each Sieve Size

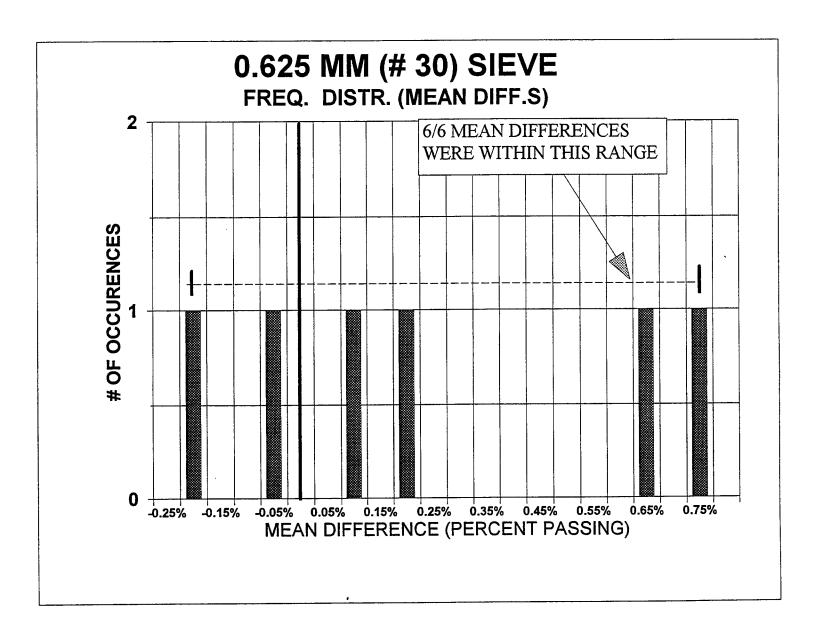




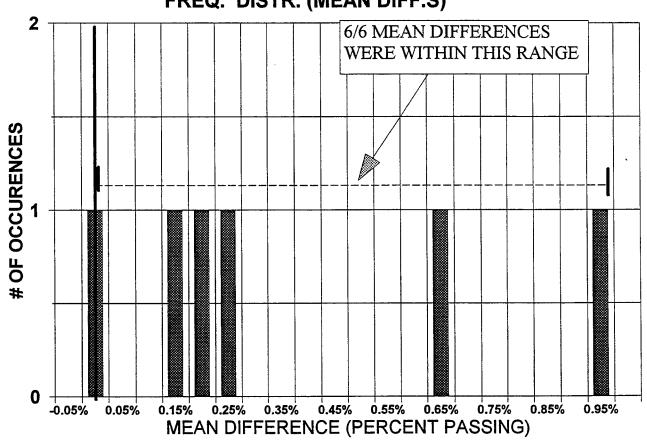


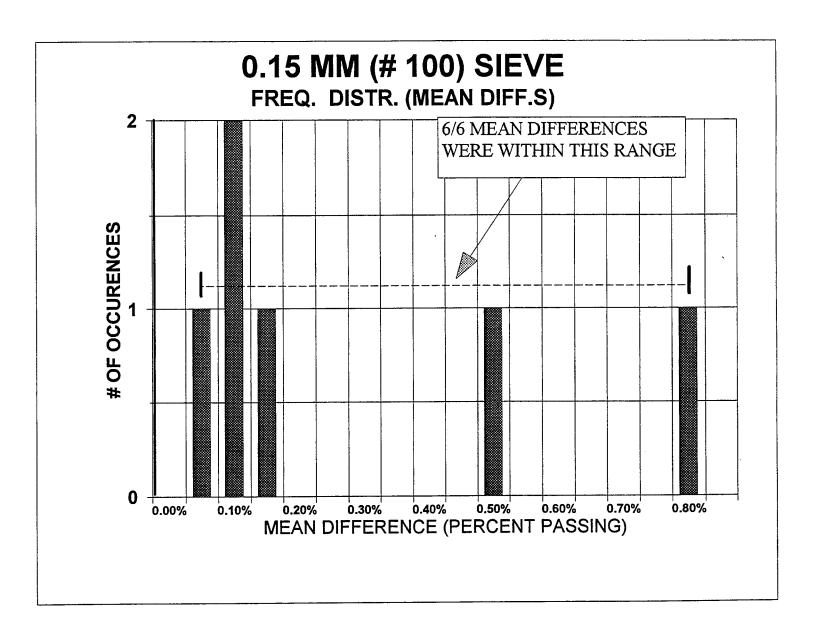


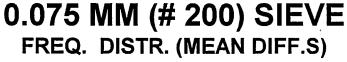


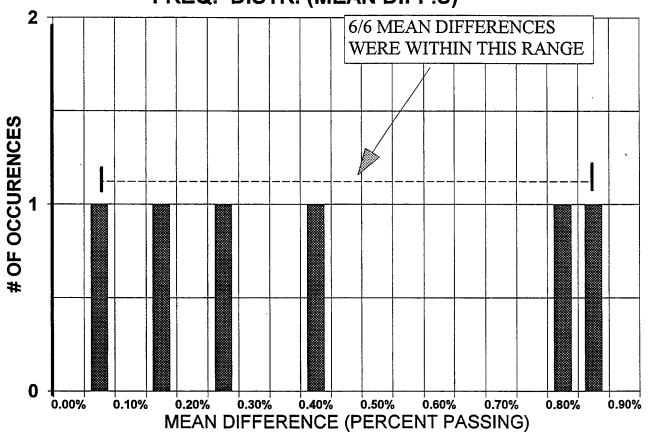












# **APPENDIX D**

# **METHOD TWO**

- \* Data Used to Create Figure 6
- \* Data Used to Create Figure 7
- \* Data Used to Create Figure 8
- \* Determination of Correction Factors Using Analysis Method Two

# DATA USED TO GENERATE FIGURE 6

FRANCISCOTTI EXPERIMENTAL					
			_		
SIEVE SIZE AGGREGATE	PERCENT PASSINGE	RCENT PASSING ONE SIEV	SINGLE OPERATOR PR	RECISION \	DIFF.
DESCRIPTION	EACH SIEVE SIZE	AND RETAINED ON THE	<u> </u>	₿ \	BETWEEN
		NEXT FINER SIEVE	AFTER 3 SPLITS	AASHTO \	COLUMN A - COLUMN B
			STANDARD DEVIATION	T 27	
			OF THE	AFTER 1 SPLIT	l .
			PERCENT DIFF.S	AGGREGATE	1
			BETWEEN EXP.	ONLY	\
			AND CONTROL SPECIMENS	100 PAIRED	\
			ALL POSSIBLE	TEST RESULTS	\
			COMBINATIONS		\
			PRECISON	PRECISION	PRECISION
			(1S),%	(1S),%	(1S),%
1/2 COARSE	99.66%		0.30		
3/8 COARSE	70.52%	29,14%	1.51	1.38	0.13
#4 FINE	45.84%	24.69%	1.93	0.64	1.29
#8 FINE	33.61%	12.23%	2.12	0.60	1.52
#16 FINE	24.79%	8.82%	2.11	0.43	1,68
#30 FINE	17.36%	7,43%	1.20	0.43	0.77
#50 FINE	11.32%	6.04%	1.19	0.43	0.76
#100 FINE	7.30%	4.02%	0.73	0.43	0,30
#200 FINE	4.60%	2.69%	0.45	0.14	0.31

WINDSOR/IRWIN						WINDSOR/IRWIN
EXPERIMENTAL SIEVE SIZE	AGGREGATE		RCENT PASSING ONE SIEV			DIFF.
	DESCRIPTION	EACH SIEVE SIZE	AND RETAINED ON THE	A	<u> </u>	BETWEEN
			NEXT FINER SIEVE	AFTER 3 SPLITS	AASHTO	COLUMN A - COLUMN B
				STANDARD DEVIATION	T 27	
				OFTHE	AFTER 1 SPLIT	
				PERCENT DIFF.S	AGGREGATE	
				BETWEEN EXP.	ONLY	ļ
				AND CONTROL SPECIMENS	100 PAIRED	<u>t</u>
				ALL POSSIBLE	TEST RESULTS	İ
				COMBINATIONS		
				PRECISON	PRECISION	PRECISION
				(18),%	(15),%	(1S),%
SIEVE SIZE						-
1/2	COARSE	99.81%		0.35		
3/8	COARSE	80.17%	19.64%	2.63	0.95	1.68
#4	FINE	59.51%	20.66%	1.97	0.64	1.23
#8	FINE	43.91%	15.60%	1.70	0.60	1.1
#16	FINE	32.09%	11.82%	2.01	0.60	1,41
#30	FINE	22.67%	9.42%	1.94	0.43	1.51
#50	FINE	14.63%	8.05%	1.35	0.43	0.92
#100	FINE	9.16%	5.47%	0.78	0.43	0,35
#200	FINE	5.88%	3.28%	0.45	0.43	9,02
	,					

RALSTON						RALSTON
EXPERIMENTAL				_		
SIEVE SIZE	AGGREGATE		RCENT PASSING ONE SIEV	1 -		DIFF.
	DESCRIPTION	EACH SIEVE SIZE	AND RETAINED ON THE	A	В	BETWEEN
			NEXT FINER SIEVE	AFTER 3 SPLITS	AASHTO T 27	COLUMN A - COLUMN B
				STANDARD DEVIATION		l
				OF THE	AFTER 1 SPLIT AGGREGATE	1
				PERCENT DIFF.S BETWEEN EXP.	ONLY	
				AND CONTROL SPECIMENS	100 PAIRED	1
				ALL POSSIBLE	TEST RESULTS	
				COMBINATIONS	, COLINEOUE 10	
				PRECISON	PRECISION	PRECISION
				(15),%	(1S),%	(18),%
4				COMBINATIONS	COMBINATIONS	
				PRECISON	PRECISION	
				(D1S),%	(D2S),%	
SIEVE SIZE						
1/2	COARSE	98.17%		0.57		
3/8	COARSE	81.19%	16.99%	1,77	0.95	9.82
#4	FINE	66.56%	14.63%	1.8	0.6	12
#8	FINE	41.61%	24.95%	2.3	0.64	1.66
#16	FINE	26.68%	14.93%	2.12	0.6	1.52
#30	FINE	16.92%	9.77%	1.72	0.43	1.29 0.58
#50	FINE	8.99%	7.93%	1.01	0.43	.00000000000000000000000000000000000000
#100	FINE	5.01%	3.97%	0.54	0.43	0.11
#200	FINE	2.74%	2.28%	0.29	0.14	<del>0</del> :15

# DATA USED TO GENERATE FIGURE 6

MONK EXPERIMENTAL						MONK
SIEVE SIZE	AGGREGATE		RCENT PASSING ONE SIEV	1		DIFF.
	DESCRIPTION	EACH SIEVE SIZE	AND RETAINED ON THE NEXT FINER SIEVE	AFTER 3 SPLITS	B AASHTO	DOLUMN A - COLUMN B
			NEXT FINER SIEVE	STANDARD DEVIATION	T 27	COLUMN A - COLUMN B
				OF THE	AFTER 1 SPLIT	I \
				PERCENT DIFF.S	AGGREGATE	I \
				BETWEEN EXP.	ONLY	\
				AND CONTROL SPECIMENS	100 PAIRED	<b> </b> \
				ALL POSSIBLE	TEST RESULTS	<b>!</b> \
				PRECISON	PRECISION	PRECISION
				(15),%	(1S),%	(15),%
				COMBINATIONS	,	. /
				PRECISON		\
				(D1S),%		7
SIEVE SIZE				, ,		¥
1/2	COARSE	99.29%		0.59		
3/8	COARSE	81.99%	17.30%	1.91	0.95	Q,96
#4	FINE	64.10%	17.89%	1.73	0.60	1.13
#8	FINE	41.67%	22.43%	2.33	0.64	1.69
#16	FINE FINE	29.43% 21.19%	12.24% 8.24%	2.97 2.72	0.60 0.43	237 229
#30 #50	FINE	13.53%	7.65%	1.78	0.43	135
#100	FINE	7.85%	5.69%	1.2	0.43	0.77
#200	FINE	4.34%	3.50%	2.13	0.43	1.7
	<u>-</u>					

VALCO EXPERIMENTAL						VALCO
SIEVE SIZE	AGGREGATE	PERCENT PASSING	RCENT PASSING ONE SIEV	SINGLE OPERATOR PI	RECISION	DIFF.
	DESCRIPTION	EACH SIEVE SIZE	AND RETAINED ON THE	i A	B	BETWEEN
			NEXT FINER SIEVE	AFTER 3 SPLITS	AASHTO	COLUMN A - COLUMN B
				STANDARD DEVIATION	T 27	
				OFTHE	AFTER 1 SPLIT	
				PERCENT DIFF.S	AGGREGATE	
				BETWEEN EXP.	ONLY	
				AND CONTROL SPECIMENS	100 PAIRED	
				ALL POSSIBLE	TEST RESULTS	
				COMBINATIONS		l
				PRECISON	PRECISION	PRECISION
				(15),%	(1S),%	(1S),%
				COMBINATIONS		
				PRECISON		
•				(D1S),%		
SIEVE SIZE						
1/2	COARSE	99.79%		0.30		
3/8	COARSE	74.15%	25.64%	2.35	1.38	0,97
#4	FINE	61.42%	12.73%	2.29	0.60	1.69
#8	FINE	45.51%	15.91%	2.06	0.60	1.46
#16	FINE	35.18%	10.33%	2.04	0.60	1.44
#30	FINE	25.81%	9.37%	1.81	0.43	1.38
<b>#</b> 50	FINE	11.86%	13.95%	0.88	0.60	0.28
#100	FINE	5.01%	6.85%	0.38	0.43	-0.05
#200	FINE	2.77%	2.24%	0.21	0.14	0.07

PAGOSA EXPERIMENTAL				_		PAGOSA
SIEVE SIZE	AGGREGATE	PERCENT PASSINGE	RCENT PASSING ONE SIEV	SINGLE OPERATOR P	RECISION	DIFF.
	DESCRIPTION	EACH SIEVE SIZE	AND RETAINED ON THE	Α	B	BETWEEN
			NEXT FINER SIEVE	AFTER 3 SPLITS	AASHTO	COLUMN A - COLUMN B
				STANDARD DEVIATION	T 27	i
				OF THE	AFTER 1 SPLIT	
				PERCENT DIFF.S	AGGREGATE	ļ
				BETWEEN EXP.	ONLY	
				AND CONTROL SPECIMENS		1
				ALL POSSIBLE	TEST RESULTS	
				COMBINATIONS		1
				PRECISON	PRECISION	PRECISION
				(1S),%	(1S),%	[ (1S),%
				COMBINATIONS		
				PRECISON		
				(D1S),%		
SIEVE SIZE						200000000000000000000000000000000000000
1/2	COARSE	100.00%		0.35	4.00	1.25
3/8	COARSE	75.54%	24.46%	2.63	1.38 0.64	1.33
#4	FINE	51.29%	24.25%	1.97 1.7	0.60	133
#8	FINE	36.74%	14.55%		0.60	5.41
#16	FINE	26.02% 18.76%	10.72%	2.01 1.94	0.43	1.51
#30	FINE	18.76%	7.26% 5.76%	1.35	0.43	0.92
#50	FINE FINE		5.76% 4.20%	1.35 0.78	0.46	0.32
#100		8.80%	4.20% 2.67%	0.45	0.46	0.31
#200	FINE	6.13%	2.0176	0.40	U. 14	**************************************

	OIFFERE	((CES/E)	TWEEN	EXP. AN	D CONTRO	)LSPEC	IMENS		
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
	-0.10%	3.83%	3.93%	2.20%	1.73%	1.83%	1,54%	1.10%	0.75%
	-0.51% -0.51%	1.20% 1.86%	1.85% 2.11%	-0.98% 1.07%	-2.20% 1.04%	1.83% 1.21%	-1.13% 0.92%	-0.61% 0.52%	-0.27% 0.28%
	-0.23%	0.33%	-1.09%	-3.03%	-2.78%	0.62%	-0.67%	-0.31%	-0.16%
	-0.59% -0.59%	-0.73% -0.07%	0.49% 0.75%	-0.21% 1.84%	-1.52% 1.72%	-1.71% -1.71%	-1.15% 0.90%	+0.53% 0.60%	-0.07% 0.48%
	-0.31%	-1.60%	-2.45%	-2.26%	-2.10%	-1.44%	+0:69%	+0.23%	0.04%
	-0.18% -0.27%	1.90% 0.88%	2.57% 1.88%	2.96% 1.91%	2.41% 1.34%	-0.27% 0.75%	1,52% 0,41%	1,19% 0,23%	0.95% 0.12%
	0.00%	-0.65%	-1 32%	-219%	-247%	0.75%	-1.18%	-0.60%	-0.32%
	0.14% -0.27%	2.85% 0.22%	3.70% 1.62%	3 03% -0 14%	2.03% -1.90%	1,37% -0,62%	1,03% -1,63%	0.81% -0.90%	0.59% -0.42%
	0.28%	-0.46%	-1.62%	-1.74%	-1.25%	-0.67%	-0.17%	0.01%	0.07%
	0.41%	3.04% 0.41%	3.40% 1.31%	3.49% 0.31%	3.25% -0.67%	-0.67% -0.93%	2.04% -0.62%	1.42% -0.29%	0.98% -0.04%
16 COMBINATIONS	0.00%	1.07%	1.57%	236%	256%	0.27%	1.42%	0.84%	0.51%
FRANCISCOTT			·· .=				-		
MEAN STD. DEV.	-0.17% 0.30%	0.88% 1.51%	1.17% 1.93%	0.54% 2.12%	0.07% 2.11%	0.04% 1.20%	0.16% 1.19%	0.20% 0.73%	0.22% 0.45%
_	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
	-1,48% -1,36%	1.79% 0.11%	0.84% -1.01%	1.80% -0.99%	2.80% 0.09%	2.70% 0.63%	1.81% 0.73%	1,07% 0,57%	0.58% 0.43%
	-1,48%	0.04%	-1 02%	201%	3.16%	2.98%	1,94%	1.02%	0.38%
	0,12% -0.20%	-2.04% 2.19%	-1.68% 0.58%	-3.00% -1.74%	-0.47% -1.83%	0.22% -1.46%	0.54% -0.82%	0.39% -0.39%	0.18% -0.15%
	-0.32%	2.11%	0.57%	1.26%	1.24%	0.90%	0.40%	0.05%	-0.19%
	0.06%	0.03% 3.87%	-0.09%	-2.16%	-2.39%	-1.86%	-1.00% 0.26%	-0.57%	-0.39% 0.01%
	-0.39% -0.97%	1.09%	2.43% -0.36%	3.41% 0.33%	0.88% 0.14%	0.61% 0.03%	0.20%	0.11% -0.05%	-0.08%
	-0.58%	-0.99%	-1.02%	-3.08%	-3 49%	-2.73%	-1.39%	-0.68%	-0.27%
	-0.97% 0.39%	2.84% 1.17%	1 50% -0 35%	0.12% -3.20%	-0.22% -2.93%	-0.25% -2.32%	-0.13% -1.21%	0.00% -0.49%	0.13% -0.03%
	-0.47%	0.69%	2.20%	0.38%	-0.52%	-0.57%	-0.13%	0.01%	0.10%
	-0.85% -0.73%	4.52% 2.85%	4.72% 2.87%	3.58% 0.79%	2.74% 0.04%	1.91% -0.16%	1.13% 0.05%	0.69% 0.19%	0.50% 0.35%
16 COMBINATIONS	-0.12%	2.77%	2.85%	279%	3.11%	2.19%	1.27%	0.64%	0.30%
RALSTON									
MEAN	-0.58%	1.44%	0.81%	0.14%	0.15%	0.18%	0.22%	0.16%	0.12%
STD. DEV.	0.57% 1/2	1.77% 3/8	1.80% #4	2.30% #8	2.12% #16	1.72% #30	1.01% #50	0.54% #100	0.29% #200
	0.00% 0.49%	-3.98% -2.21%	-1.69% 0.89%	-1.89% 0.13%	-2.39% -0.05%	-2.26% 0.02%	-0.75% 0.45%	-0.14% 0.37%	+0.03% 0.20%
	0.24%	-3.72%	-1.57%	-2.43%	-3,64%	-3.45%	-1.29%	-0.43%	-0.29%
	0.00%	-1.12%	-0.14%	-0,94% 2.55%	-1.85% 3.20%	-1.48% 2.98%	-0.14% 1.77%	0.25% 0.77%	0.18% 0.31%
	0.11% -0.14%	-0.97% -2.48%	1.45% -1.00%	-0.01%	-0.39%	-0.49%	0.04%	-0.03%	-0.18%
	-0.38% -0.38%	0.13%	0.43%	1.48%	1.40% 0.86%	1.48% 0.70%	1.19% 0.57%	0.65% 0.26%	0.29% 0.07%
	-0.38% -0.21%	-2.74% -0.12%	-1.12% -1.22%	0.53% -1.23%	-2.43%	-2.65%	-1.20%	-0.48%	-0.28%
	-0.45%	2.48%	0.21%	0.26%	-0.64%	-0.68%	-0.04% -0.66%	0.20% -0.19%	0.19%
	-0.45% 0.04%	-0.39% 1.38%	-1.34% 1.23%	-0.69% 1.33%	-1.18% 1.16%	-1.46% 0.82%	0.54%	0.32%	-0.03% 0.21%
	0.00%	3.88%	4.64%	3.77%	1.83%	1.09%	0.70%	0.49%	0.23%
	0.00% 0.49%	1.02% 2.79%	3.09% 5.66%	2.82% 4.84%	1.29% 3.63%	0.31% 2.59%	0.08% 1.28%	0.10% 0.61%	0.02% 0.26%
16 COMBINATIONS	0.24%	1.28%	3.21%	2.28%	0.04%	-0.88%	-0.46%	-0.19%	-0.23%
MEAN	-0.03%	-0.30%	0.80%	0.80%	0.05%	-0.21%	0.13%	0.16%	0.06%
STD. DEV.	0.30%	2.35%	2.29%	2.06%	2.04%	1.81%	0.88%	0.38%	0.21%

			EXPERIM	ENTAL - C	ONTROL					
	1/2	3/8	#4	#3	#16	#30	#50	#100	#200	
596-1	99.49%	71,45%	46.37%	32.88%	24,16%	17.23%	11.32%	7.27%	4.53%	EXP.
596X-5	99.59%	67.61%	42.44%	30.68%	22.43%	15.40%	9,78%	6.16%	3.78%	CONTROL
% DIFF	-0.10%	3.83%	3.93%	2.20%	1.73%	1.83%	1.54%	1.10%	0.75%	
596X-2	99.41%	69.52%	45.01%	33.65%	24.84%	17.34%	11.30%	7.35%	4.73%	EXP.
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	19.04%	12.45%	7.88%	4.80%	CONTROL
% DIFF	-0.59%	-0.73%	0.49%	-0.21%	-1.52%	-1.71%	-1.15%	-0.53%	-0.07%	
596X-3	99.73%	70.47%	46.14%	33.72%	24.46%	16.77%	10.82%	6.98%	4.38%	EXP.
596X-7	100.00%	69.59%	44.26%	31.81%	23.13%	16.02%	10.40%	6.75%	4.25%	CONTROL
% DIFF	-0.27%	0.88%	1.88%	1.91%	1.34%	0.75%	0,41%	0.23%	0.12%	
596X-4	100,00%	70.66%	45.83%	34.17%	25.69%	18,11%	11.83%	7,59%	4.76%	EXP.
E-V303	00 72%	71 11%	47 45%	35 01%	26 04%	10 70%	12.00%	7 58%	A 60%	CONTROL

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	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	
596X-1	99.49%	71.45%	46.37%	32,88%	24,16%	17.23%	11,32%	7.27%		FXP
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	19.04%	12.45%	7.88%		CONTROL
% DIFF	-0.51%	1.20%	1.85%	-0.98%	-2.20%	-1.81%	-1.13%	-0.61%		
596X-2	99.41%	69.52%	45.01%	33.65%	24.84%	17.34%	11.30%	7.35%	4.73%	EXP.
596X-7	100.00%	69.59%	44.26%	31.81%	23.13%	16.02%	10.40%	6.75%	4.25%	CONTROL
% DIFF	-0.59%	-0.07%	0.75%	1.84%	1.72%	1.32%	0,90%	0.60%		
596X-3	99.73%	70.47%	46.14%	33.72%	24.46%	16.77%	10.82%	6.98%	4.38%	EXP.
596X-8	99.72%	71.11%	47.45%	35,91%	26.94%	18.78%	12,00%	7.58%	4.69%	CONTROL
% DIFF	0.00%	-0.65%	-1.32%	-2.19%	-2.47%	-2.00%	-1.18%	-0.60%		
596X-4	100.00%	70.66%	45.83%	34.17%	25,69%	18.11%	11.83%	7.59%	4.76%	EXP.
596X-5	99.59%	67.61%	42,44%	30,68%	22.43%	15.40%	9.78%	6.16%	3.78%	CONTROL
4 DIEE	0.41%	3 04%	3.40%	3 40%	3 25%	2 71%	2 0494	1 4 2%	0.00%	

# RALSTON

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	97,60%	79.72%	65.03%	41.77%	27.93%	18.37%	10.02%	5.62%	3.01% EXP.
non-NCAT-5	99.08%	77.93%	64.19%	39.97%	25.14%	15.68%	8.22%	4.54%	2.43% CONTROL
% DIFF	-1.48%	1.79%	0.84%	1.80%	2.80%	2.70%	1.81%	1.07%	0.58%
NCAT-2	98.76%	81.80%	66.62%	41.02%	26.01%	16.29%	8.48%	4.65%	2.44% EXP.
non-NCAT-6	98.96%	79.61%	66.04%	42.76%	27.84%	17.75%	9.30%	5.04%	2.59% CONTROL
% DIFF	-0.20%	2.19%	0.58%	-1.74%	-1.83%	-1.46%	-0.82%	-0.39%	-0.15%
NCAT-3	98.11%	80.78%	65,69%	40.10%	24,91%	15,42%	8.09%	4.55%	2.56% EXP.
non-NCAT-7	99.08%	79,69%	66.05%	39.76%	24.77%	15.39%	8.08%	4.60%	2.63% CONTROL
% DIFF	-0.97%	1.09%	-0.36%	0.33%	0.14%	0.03%	0.01%	-0.05%	-0.08%
NCAT-4	98.23%	82.45%	68.90%	43.55%	27,88%	17.59%	9.35%	5.24%	2.93% EXP.
non-NCAT-8	98.69%	81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2.83% CONTROL
% DIFF	-0.47%	0.69%	2.20%	0.38%	-0.52%	-0.57%	-0.13%	0.01%	0.10%

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	97.60%	79.72%	65.03%	41.77%	27.93%	18.37%	10.02%	5.62%	3.01% EXP.
non-NCAT-6	98.96%	79.61%	66.04%	42.76%	27.84%	17.75%	9.30%	5.04%	2.59% CONTROL
% DIFF	-1.36%	0.11%	-1.01%	-0.99%	0.09%	0.63%	0.73%	0.57%	0.43%
NCAT-2	98.76%	81.80%	66.62%	41.02%	26.01%	16.29%	8.48%	4.65%	2.44% EXP.
non-NCAT-7	99.08%	79.69%	66.05%	39.76%	24.77%	15.39%	8.08%	4.60%	2.63% CONTROL
% DIFF	-0.32%	2.11%	0.57%	1,26%	1.24%	0.90%	0.40%	0.05%	-0.19%
NCAT-3	98.11%	80.78%	65.69%	40,10%	24,91%	15.42%	8.09%	4.55%	2.56% EXP.
non-NCAT-8	98.69%	_81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2.83% CONTROL
% DIFF	-0.58%	-0.99%	-1.02%	-3,08%	-3.49%	-2.73%	-1.39%	-0.68%	-0.27%
NCAT-4	98.23%	82.45%	68.90%	43.55%	27.88%	17.59%	9.35%	5.24%	2.93% EXP.
non-NCAT-5	99.08%	77.93%	64,19%	39.97%	25.14%	15.68%	8.22%	4.54%	2.43% CONTROL
% DIFF	-0.85%	4.52%	4.72%	3,58%	2.74%	1.91%	1.13%	0.69%	0.50%

# VALCO/ROCKY MOUNTAIN/CAS PIT:

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	100.00%	71,69%	60.00%	43.43%	33,15%	24.23%	11.29%	4.86%	2.75% EXP.
NON NCAT-5	100.00%	75.67%	61.68%	45.32%	35.54%	26.49%	12.05%	5.00%	2.78% CONTROL
% DIFF	0.00%	-3.98%	-1.69%	-1.89%	-2.39%	-2.26%	-0.75%	-0.14%	-0.03%
NCAT-2	99,62%	72.94%	60.56%	45.85%	35,40%	27.19%	12.62%	5.26%	2.85% EXP.
NON NCAT-6	99.51%	73.90%	59.11%	43.30%	33.20%	24.21%	10.84%	4.49%	2.54% CONTROL
	0.11%	-0.97%	1.45%	2.55%	3.20%	2.98%	1.77%	0.77%	0.31%
NCAT-3	99.55%	75.29%	60.34%	44.62%	34,36%	25.03%	11.39%	4.81%	2.75% EXP.
NON NCAT-7	99.76%	75.41%	61.56%	45,86%	36,79%	27.68%	12.58%	5.29%	3.03% CONTRO!
	-0.21%	-0.12%	-1.22%	-1.23%	-2.43%	-2.65%	-1.20%	-0.48%	-0.28%
NCAT-4	100.00%	76.69%	64.77%	48.14%	36.83%	26.80%	12.13%	5.10%	2.80% EXP.
NON NCAT-8	100.00%	72.81%	60.13%	44.37%	35.00%	25.71%	11.43%	4.61%	2.56% CONTROL
	0.00%	3.88%	4.64%	3.77%	1.83%	1.09%	0.70%	0.49%	0.23%

SIEVE SIZE	1/2	3/8	#4	#	#16	#30	#50	#100	#200	
NCAT-1	100.00%	71.69%	60.00%	43.43%	33.15%	24.23%	11.29%	4.86%	2.75%	EXP.
non-NCAT-6	99.51%	73.90%	59.11%	43.30%	33.20%	24.21%	10.84%	4.49%	2.54%	CONTROL
% DIFF	0.49%	-2.21%	0.89%	0.13%	-0.05%	0.02%	0.45%	0.37%	0.20%	
NCAT-2	99.62%	72.94%	60.56%	45.85%	36.40%	27.19%	12.62%	5.26%	2.85%	EXP.
non-NCAT-7	99.76%	75.41%	61.56%	45,86%	36,79%	27.68%	12.58%	5.29%	3.03%	CONTROL
% DIFF	-0.14%	-2.48%	-1.00%	-0.01%	-0.39%	-0.49%	0.04%	-0.03%	-0.18%	
NCAT-3	99.55%	75.29%	60.34%	44,62%	34,36%	25.03%	11.39%	4.81%	2.75%	EXP.
non-NCAT-8	100.00%	72.81%	60.13%	44.37%	35.00%	25.71%	11.43%	4.61%	2.56%	CONTROL
% DIFF	-0.45%	2.48%	0.21%	0.26%	-0.64%	-0.68%	-0.04%	0.20%	0.19%	
NCAT-4	100.00%	76.69%	64.77%	48.14%	36.83%	26.80%	12.13%	5.10%	2.80%	EXP.
non-NCAT-5	100.00%	75.67%	61.68%	45,32%	35,54%	26,49%	12.05%	5.00%	2.78%	CONTROL
% DIFF	0.00%	1.02%	3.09%	2.82%	1 29%	0.31%	0.08%	0.10%	0.02%	

# Irwin Windsor/Stute Pit:

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	
NCAT-1	99.78%			44.50%	33.76%	24.42%	15.79%	9.73%	6.10%	EXP
NON NCAT-5	100.00%	80.67%	59.97%	43.01%	31.60%	22.14%	13.88%	8.29%	4,99%	CONTROL
% DEFF	-0.22%	-0,68%	-1.32%	1.49%	2.16%	2.28%	1.90%	1.44%	1,11%	
NCAT-2	99.45%	82.21%	60.11%	42.64%	30.06%	20.80%	13.37%	8.47%	5.59%	EXP
<b>NON NCAT-6</b>	99.70%	81.64%	60.27%	44.14%	31.81%	22.03%	13.90%	8.57%	5.49%	CONTROL
% DIFF	-0.26%	0,56%	-0.16%	-1.50%	-1.75%	-1.23%	-0.54%	-0.10%	0.11%	
NCAT-3	100,00%	78.89%	58.50%	42.87%	31.01%	21.76%	14.02%	8.76%	5.59%	EXP
<b>NON NCAT-7</b>	100.00%	75.87%	56.65%	42.17%	30.19%	20.18%	12.33%	7.46%	4.67%	CONTROL
% DIFF	0.00%	3.02%	1.85%	0.71%	0.81%	1.59%	1.69%	1.30%	0.91%	
NCAT-4	100.00%	79.60%	60.78%	45.63%	33.53%	23.71%	15.34%	9.66%	6.25%	EXP
NON NCAT-8	99.40%	80.37%	60.86%	44,82%	33,32%	23.51%	14.71%	8.82%	5.34%	CONTROL
V SVT	0.600/	A 774	0.000/	0.044/	0.249/	0.200/	0.630/	0.049/	0.004/	-

	1/2	3/2	#4	#8	#16	#30	#50	#100	#200
NCAT-1	99.78%		58.65%						
non-NCAT-6	99.70%	81.64%	60.27%	44.14%	31.81%	22.03%	13,90%	8.57%	5.49% CONTROL
% DWFF	0.08%	-1.66%	-1.62%	0.35%	1.95%	2.39%	1.88%	1.16%	0.61%
NCAT-2	99,45%	62.21%	60.11%	42.64%	30.06%	20.80%	13.37%	8.47%	5.59% EXP
non-NCAT-7	100.00%	75.87%	56,65%	42.17%	30.19%	20.18%	12.33%	7.46%	4.67% CONTROL
% DIFF	-0.55%	6.33%	3.46%	0.48%	-0.14%	0.62%	1.04%	1.01%	0.92%
NCAT-3	100.00%	78.89%	58.50%	42.87%	31.01%	21,76%	14.02%	8.76%	5.59% EXP
non-NCAT-8	99,40%	80.37%	60.86%	44,82%	33,32%	23.51%	14,71%	8.82%	5.34% CONTROL
% DIFF	0.60%	-1.48%	-2.36%	-1.95%	-2.31%	-1.74%	-0.69%	-0.06%	0.24%
NCAT-4	100.00%	79.50%	60.78%	45.63%	33.53%	23.71%	15.34%	9.66%	6.25% EXP
non-NCAT-5	100.00%	80.67%	59.97%	43.01%	31.60%	22.14%	13.88%	8.29%	4.99% CONTROL
% DIFF	0.00%	-1.06%	0.81%	2.62%	1.93%	1.56%	1.46%	1.37%	1.25%

		TTI

	1/2	3/B	#4	#8	#16	#30	#50	#100	#200	
596X-1	99,49%	71.45%	46.37%	32.88%	24.16%	17.23%	11.32%	7.27%	4.53%	EXP.
596X-7	100.00%	69.59%	44.25%	31.81%	23,13%	16.02%	10.40%			CONTROL
% D#F.	-0.51%	1.86%	2.11%	1.07%	1.04%	1.21%	0.92%	0.52%	0.28%	
596X-2	99,41%	69.52%	45.01%	33.65%	24.84%	17.34%	11.30%	7,35%	4.73%	EXP.
596X-8	99.72%	71.11%	47.45%	35.91%	26.94%	18,78%	12.00%	7.58%	4.69%	CONTROL
% DFF.	-0.31%	-1.60%	-2.45%	-2.26%	-2.10%	-1.44%	-0.69%	-0.23%	0.04%	
596X-3	99,73%	70.47%	46.14%	33.72%	24.46%	16.77%	10.82%	6.98%	4.38%	EXP.
596X-5	99.59%	67,61%	42.44%	30.68%	22.43%	15.40%	9.78%	8.16%	3.78%	CONTROL
% DIFF.	0.14%	2.85%	3.70%	3.03%	2.03%	1.37%	1.03%	0.81%	0.59%	
598X-4	100.00%	70.66%	45.83%	34,17%	25.69%	18.11%	11.83%	7.59%	4.76%	EXP.
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	_ 19.04%	12.45%	7.88%	4.80%	CONTROL
N DIEE	0.00%	0.41%	1 31%	0.31%	-0.67%	-0.93%	-0.62%	-0.29%	-0.04%	

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
596X-1	99,49%	71.45%	46.37%	32.88%	24,16%	17.23%	11.32%	7.27%	4,53% EXP.
596X-8	99.72%	71.11%	47.45%	35.91%	26.94%	18.78%	12.00%	7.58%	4.69% CONTROL
% DIFF.	-0.23%	0.33%	-1.09%	-3.03%	-2.78%	-1.55%	-0.67%	-0.31%	-0.16%
596X-2	99.41%	69.52%	45.01%	33.65%	24.84%	17.34%	11.30%	7.35%	4.73% EXP.
596X-5	99.59%	67,61%	42.44%	30.68%	22.43%	15.40%	9.78%	6.16%	3.78% CONTROL
% DIFF.	-0.18%	1.90%	2.57%	2.96%	2.41%	1.94%	1.52%	1.19%	0.95%
596X-3	99.73%	70,47%	46.14%	33.72%	24.46%	16.77%	10.82%	6.98%	4.38% EXP.
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	19.04%	12.45%	7.88%	4.80% CONTROL
% DIFF.	-0.27%	0.22%	1.62%	-0.14%	-1.90%	-2,27%	-1.63%	-0.90%	-0.42%
596X-4	100.00%	70.66%	45.83%	34.17%	25.69%	18.11%	11.83%	7.59%	4.76% EXP.
596X-7	100.00%	69.59%	44.26%	31.81%	23.13%	16.02%	10.40%	6.75%	4.25% CONTROL
% DIFF.	0.00%	1.07%	1.57%	2.36%	2.56%	2.09%	1.42%	0.84%	0.51%

RALSTON SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	<b>#1</b> 00	#200
NCAT-1	97,60%	79.72%	65.03%	41.77%	27.93%	18.37%	10.02%	5.62%	3.01% EXP.
non-NCAT-7	99.08%	79.69%	66.05%	39.76%	24.77%	15.39%	8.08%	4.60%	2.63% CONTROL
% DIFF	-1.48%	0.04%	-1.02%	2.01%	3.16%	2.98%	1.94%	1.02%	0.38%
NCAT-2	98.76%	81,80%	66.62%	41.02%	26.01%	16.29%	8.48%	4.65%	2.44% EXP.
non-NCAT-8	98,69%	81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2,83% CONTRO
% DIFF	0.06%	0.03%	-0.09%	-2.16%	-2.39%	-1.86%	-1.00%	-0.57%	-0.39%
NCAT-3	98.11%	80.78%	65.69%	40.10%	24.91%	15.42%	8.09%	4.55%	2.56% EXP.
non-NCAT-5	99.08%	77.93%	64.19%	39.97%	25.14%	15.68%	8.22%	4.54%	2.43% CONTROL
% DIFF	-0.97%	2.84%	1.50%	0.12%	-0.22%	-0.25%	-0.13%	0.00%	0.13%
NCAT-4	98.23%	82,45%	68.90%	43.55%	27.88%	17.59%	9.35%	5.24%	2.93% EXP.
non-NCAT-6	98.96%	79,61%	66.04%	42.76%	27.84%	17.75%	9.30%	5.04%	2.59% CONTRO
% DIFF	-0.73%	2.85%	2.87%	0.79%	0.04%	-0.16%	0.05%	0.19%	0.35%

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	97.60%	79,72%	65.03%	41.77%	27.93%	18,37%	10.02%	5.62%	3.01% EXP.
non-NCAT-8	98.69%	81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2.83% CONTROL
% DIFF.	-1.09%	-2.04%	-1.68%	-1.40%	-0.47%	0.22%	0.54%	0.39%	0.18%
NCAT-2	98.76%	81.80%	66.62%	41.02%	26.01%	16.29%	8.48%	4.65%	2.44% EXP.
non-NCAT-5	99.08%	77.93%	64.19%	39.97%	25.14%	15.68%	8.22%	4.54%	2.43% CONTROL
% DIFF.	-0.32%	3.87%	2,43%	1.05%	0.88%	0.61%	0.26%	0.11%	0.01%
NCAT-3	98.11%	80.78%	65.69%	40.10%	24.91%	15.42%	8.09%	4.55%	2.56% EXP.
non-NCAT-6	98.96%	79.61%	66.04%	42.76%	27.84%	17.75%	9.30%	5.04%	2.59% CONTROL
% DIFF.	-0.85%	1.17%	-0.35%	-2.67%	-2.93%	-2.32%	-1.21%	-0.49%	-0.03%
NCAT-4	98.23%	82.45%	68.90%	43.55%	27.88%	17,59%	9.35%	5.24%	2.93% EXP.
non-NCAT-7	99.08%	79.69%	66.05%	39.76%	24.77%	15.39%	8.08%	4,60%	2.63% CONTROL
% DIFF.	-0.86%	2.77%	2.85%	3.79%	3.11%	2.19%	1.27%	0,64%	0.30%

# VALCO/ROCKY MOUNTAIN/CAS PIT:

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	
NCAT-1	100.00%	71.69%	60.00%	43.43%	33.15%	24.23%	11.29%	4.86%	2.75%	EXP.
non-NCAT-7	99.76%	75.41%	61,56%	45.86%	35.79%	27,68%	12.58%	5,29%	3.03%	CONTROL
% DIFF	0.24%	-3.72%	-1.57%	-2.43%	-3.64%	-3.45%	-1.29%	-0.43%	-0.29%	
NCAT-2	99.62%	72,84%	60.56%	45.85%	36,40%	27.19%	12.62%	5.26%	2.85%	EXP.
non-NCAT-8	100.00%	72.81%	60.13%	44.37%	35.00%	25.71%	11.43%	4.61%	2.56%	CONTROL
% DIFF	-0.38%	0.13%	0.43%	1,48%	1.40%	1.48%	1.19%	0.65%	0.29%	
NCAT-3	99.55%	75,29%	60,34%	44.62%	34.36%	25.03%	11.39%	4.81%		
non-NCAT-5	100.00%	75.67%	61,68%	45.32%	35.54%	26,49%	12.05%	5,00%	2.78%	CONTROL
% DIFF	-0.45%	-0,39%	-1.34%	-0.69%	-1.1B%	-1,46%	-0.66%	-0.19%	-0.03%	
NCAT-4	100.00%	76.69%	64,77%	48.14%	36.83%	26.80%	12.13%	5.10%	2.80%	EXP.
non-NCAT-6	99,51%		59.11%	43.30%	33,20%	24.21%	10,84%	4.49%	2.54%	CONTROL
% DIFF	0.49%		5.66%	4.84%	3.63%	2.59%	1.28%	0,61%	0.26%	

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	100.00%	71.69%	60.00%	43.43%	33.15%	24.23%	11.29%	4.86%	2.75% EXP.
non-NCAT-\$	100.00%	72.81%	60.13%	44.37%	35.00%	25.71%	11.43%	4.61%	
% DIFF.	0.00%	-1.12%	-0.14%	-0.94%	-1.85%	-1.48%	-0.14%	0.25%	0.18%
NCAT-2	99.62%	72.94%	60.56%	45.85%	36.40%	27.19%	12.52%	5.26%	2.85% EXP.
non-NCAT-5	100.00%	75.67%	61.68%	45.32%	35,54%	26.49%	12.05%	5,00%	2.78% CONTROL
% DIFF.	-0.38%	-2.74%	-1.12%	0.53%	0.86%	0.70%	0.57%	0.26%	0.07%
NCAT-3	99.55%	75,29%	60.34%	44,62%	34.36%	25.03%	11.39%	4,81%	2.75% EXP.
non-NCAT-6	99,51%	73.90%	59.11%	43.30%	33.20%	24.21%	10.84%	4.49%	2.54% CONTROL
% DIFF.	0.04%	1.38%	1.23%	1.33%	1.16%	0.82%	0.54%	0.32%	0.21%
NCAT-4	100.00%	76,69%	64.77%	48,14%	36.83%	26.80%	12.13%	5.10%	2.80% EXP.
non-NCAT-7	99.76%	75.41%	61.56%	45.86%	36.79%	27.68%	12.58%	5.29%	3.03% CONTROL
% DIFF.	0.24%	1.28%	3.21%	2.28%	0.04%	-0.88%	-0.46%	-0.19%	-0.23%

# irwin Windsor/Stute Pit:

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	99.78%		58.65%	44.50%	33.76%	24,42%	15.79%	9.73%	6.10% EXP
non-NCAT-7	100.00%	75.87%	56.65%	42.17%	30.19%	20.18%	12.33%	7.46%	4,67% CONTROL
% DIFF	-0.22%	4.11%	2.00%	2.33%	3.57%	4.24%	3.46%	2.27%	1.43%
NCAT-2	99.45%	82.21%	60,11%	42.64%	30.06%	20,80%	13.37%	8.47%	5.59% EXP
non-NCAT-8	99.40%		60.86%	44.82%	33.32%	23.51%	14.71%	8.82%	5.34% CONTROL
% DIFF	0.04%	1.83%	-0.75%	-2.18%	-3.26%	-2.71%	-1.34%	-0.35%	0.25%
NCAT-3	100.00%	78.89%	58.50%	42.87%	31.01%	21.76%	14.02%	8.76%	5.59% EXP
non-NCAT-5	100.00%	80.67%	59.97%	43.01%	31.60%	22.14%	13.88%	8.29%	4,99% CONTROL
% DIFF	0.00%		-1.46%	-0.13%	-0.60%	-0.38%	0.13%	0.47%	0.60%
NCAT-4	100.00%	79.60%	60.78%	45.63%	33.53%	23.71%	15.34%	9.66%	6.25% EXP
non-NCAT-6				44.14%	31.81%	22.03%	13.90%	8.57%	
% DIFF	0.30%	-2.04%	0.51%	1.49%	1.72%	1,68%	1,44%	1.09%	0.76%

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	
NCAT-1	99.78%	79.98%	58.65%	44.50%	33.76%	24.42%	15.79%	9.73%	6.10%	
non-NCAT-8	99,40%	80.37%	60.86%	44.82%	33.32%	23.51%	14.71%	8.82%		CONTROL
% DIFF.	0.37%	-0.39%	-2.21%	-0.33%	0.44%	0.91%	1.08%	0.91%	0.75%	
NCAT-2	99.45%	82,21%	60,11%	42.64%	30.06%	20.80%	13.37%	8,47%	5.59%	EXP
non-NCAT-5	100.00%	80.67%	59.97%	43.01%	31.60%	22.14%	13.88%	8.29%	4.99%	CONTROL
% DIFF.	-0.55%	1.54%	0.15%	-0.36%	-1.55%	-1.34%	-0,52%	0,18%	0.61%	
NCAT-3	100.00%	78,89%	58.50%	42.87%	31.01%	21.76%	14.02%	8,76%		
non-NCAT-6	99.70%	81.64%	60.27%	44,14%	31.81%	22.03%	13.90%	8.57%	5.49%	CONTROL
% DIFF.	0.30%	-2.75%	-1.76%	-1.27%	-0.80%	-0.26%	0.11%	0.19%	0.10%	
NCAT-4	100.00%	79,60%	60.78%	45.63%	33.53%	23.71%	15.34%	9.66%	6.25%	EXP
non-NCAT-7	100.00%			42.17%	30.19%	20.18%	12.33%	7.46%		CONTROL
% DIFF.	0.00%	3.73%	4.13%	3,46%	3.34%	3.53%	3.01%	2.20%	1.57%	

# MONK PIT:

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	99.47%	82.21%	62.56%	38.03%	25.14%	17.44%	11.11%	6.52%	3.17% EXP
NON NCAT-5	99.50%	80.09%	62.74%	41.40%	28.90%	20.54%	13.15%	7.66%	3.72% CONTROL
% DIFF	-0.03%	2.12%	-0.18%	-3.37%	-3.76%	-3.10%	-2.04%	-1.14%	-0.55%
NCAT-2	98.53%	83.61%	65.02%	42.68%	30.80%	22.54%	14.76%	9.57%	7.91% EXP
NON NCAT-6	99.24%	78.83%	63.42%	43.15%	31.60%	23.12%	14.77%	8.27%	3.63% CONTROL
% DIFF	-0.71%	4.78%	1.59%	-0.47%	-0.80%	-0.59%	-0.02%	1.30%	4.27%
NCAT-3	99.16%	81.68%	64.78%	43.70%	31.90%	23.41%	14.84%	7.91%	3.14% EXP
NON NCAT-7	98.59%	82.73%	66.32%	42.41%	28.37%	19.66%	12,50%	7.28%	3.55% CONTROL
% DIFF	0.57%	-1.05%	-1.55%	1.29%	3.53%	3.74%	2.34%	0.63%	-0.41%
NCAT-4	100.00%	80.47%	64.06%	42.26%	29.88%	21.37%	13.44%	7.38%	3.15% EXP
NON NCAT-8	99.50%	79.58%	63,54%	42.81%	30.48%	21.81%	13,73%	7.66%	3.23% CONTROL
% DIFF	0,50%	0.89%	0.52%	-0.54%	-0.60%	-0.45%	-0.29%	-0.28%	-0.09%

# PAGOSA TROUT LAKES

# 15 POSSIBLE COMBINATIONS

	1/2	3/8	#4	#1	#16	#30	#50	#100	#200	
NCAT-4	100.00%	76.34%	52.40%	35.85%	25.35%	18.28%	12.53%	8.36%	5.83%	EXP
Non NCAT-1	99.74%	73.50%	46.45%	33,26%	22.75%	16.09%	11.09%	7.57%	5.33%	CONTROL
% DIFF	0.26%	2.84%	5.94%	2.59%	2.60%	2.19%	1.44%	0.79%	0.49%	
NCAT-5	100.00%	74.63%	50.46%	37.59%	27.07%	19.71%	13.81%	9.44%	6.61%	EXP
Non NCAT-2	99.80%	76.99%	54.75%	41.27%	29.60%	21.25%	14.52%	9.64%	6.63%	CONTROL
% DIFF	0.20%	-2.36%	-4.29%	-3.68%	-2.53%	-1,54%	-0.71%	-0.20%	-0.02%	
NCAT-6	100.00%	75.65%	51.00%	36.76%	25.63%	18.29%	12.65%	8.59%	5.94%	EXP
Non NCAT-3	99.46%		47,95%	32.01%	22.27%	15.76%	10.59%	6.97%	4.74%	CONTROL
W DIEE	0.549	2 20%	3 0500	4 7694	2 269	2 5 4 94	2 0690	1 679/	1 200	

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	99.47%	82.21%	62.56%	38.03%	25,14%	17.44%	11.11%	6.52%	3.17% EXP
non-NCAT-6	99.24%	78.83%	63.42%	43.15%	31.60%	23.12%	14.77%	8.27%	3.63% CONTRO!
% DEF	0.24%	3.38%	-0.86%	-5.11%	-6.46%	-5.69%	-3.66%	-1.74%	-0.46%
NCAT-2	98.53%	83.61%	65.02%	42.68%	30.80%	22.54%	14.76%	9.57%	7.91% EXP
non-NCAT-7	98.59%	82.73%	66.32%	42.41%	28.37%	19.66%	12.50%	7.28%	3.55% CONTROL
% DIFF	-0.06%	0.88%	-1.31%	0.27%	2.43%	2.87%	2.26%	2.29%	4.36% >
NCAT-3	99.16%	81.68%	64.78%	43.70%	31.90%	23.41%	14.84%	7.91%	3.14% EXP
non-NCAT-8	99.50%	79.58%	63.54%	42.81%	30.48%	21.81%	13.73%	7.66%	3.23% CONTRO
% DIFF	-0.33%	2.10%	1.24%	0.89%	1.42%	1.59%	1.11%	0.26%	-0.09%
NCAT-4	100.00%	80.47%	64.06%	42.26%	29.88%	21.37%	13.44%	7.38%	3.15% EXP
non-NCAT-5	99.50%	80.09%	62.74%	41.40%	28.90%	20,54%	13,15%	7.66%	3.72% CONTROL
% DIFF	0.50%	0.37%	1,32%	0.87%	0.98%	0.83%	0.29%	-0.28%	-0.58%

### PAGOSA TROUT LAKES

### 45 DOCCIDI E COMONISTIONS

PAGOSA IROUT EARES				13 PUSS	BLE COM	BINA HON:	\$		
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-4	100.00%	76.34%	52.40%	35.85%	25.35%	18.28%	12.53%	8.36%	5.83% EXP
Non NCAT-3	99.46%	72.27%	47,95%	32.01%	22.27%	15.76%	10.59%	6.97%	4.74% CONTROL
% DIFF	0.54%	4.07%	4.45%	3.84%	3.09%	2.53%	1.94%	1.39%	1.09%
NCAT-5	100.00%	74.63%	50.46%	37.59%	27.07%	19.71%	13.81%	9,44%	6.61% EXP
Non NCAT-1	99.74%	73.50%	46,45%	33.26%	22.75%	16.09%	11.09%	7.57%	5.33% CONTROL
% DIFF	0.26%	1.13%	4.01%	4.33%	4.32%	3.62%	2.72%	1,87%	1.27%
NCAT-6	100.00%	75.65%	51.00%	36.76%	25.63%	18.29%	12.65%	8.59%	5.94% EXP
Non NCAT-2	99.80%	76.99%	54.75%	41.27%	29.60%	21.25%	14.52%	9.64%	6.63% CONTROL
V DICE	U 5067	1 3/196	-3 75%	4 519/	2 079/	2 069/	1 079/	4 05%	0.60%

# MONK PIT:

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-1	99.47%	82,21%	62.56%	38.03%	25.14%	17.44%	11.11%	6.52%	3.17% EXP
non-NCAT-7	98.59%	82.73%	66.32%	42.41%	28.37%	19.66%	12.50%	7.28%	3.55% CONTROL
% DIFF	0.88%	-0.52%	-3.76%	-4.38%	-3,23%	-2.23%	-1.39%	-0.76%	-0.38%
NCAT-2	98.53%	83.61%	65.02%	42.68%	30.80%	22.54%	14,76%	9.57%	7.91% EXP
non-NCAT-8	99.50%	79.58%	63.54%	42.81%	30.48%	21.81%	13.73%	7.66%	3.23% CONTROL
% DIFF	-0.97%	4.04%	1.48%	-0.13%	0,32%	0.72%	1.03%	1.91%	4.67%
NCAT-3	99,16%	81.68%	64.78%	43.70%	31.90%	23.41%	14.84%	7.91%	3,14% EXP
non-NCAT-5	99,50%	80.09%	62.74%	41.40%	28.90%	20.54%	13.15%	7.66%	3.72% CONTROL
% DEF	-0.34%	1.59%	2.04%	2.30%	3.00%	2.87%	1.69%	0.25%	-0.58%
NCAT-4	100.00%	80.47%	64.06%	42.26%	29.88%	21,37%	13.44%	7.38%	3.15% EXP
non-NCAT-6	99.24%	78.83%	63.42%	43.15%	31.60%	23.12%	14.77%	8.27%	3.63% CONTROL
% DIFF	0.76%	1.64%	0.64%	-0.88%	-1.72%	-1.76%	-1.34%	-0.89%	-0.49%

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	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NCAT-4	100.00%	76,34%	52.40%	35.85%	25.35%	18.28%	12.53%	8.36%	5.83% EXP
Non NCAT-2	99.80%	76.99%	54.75%	41.27%	29.60%	21.25%	14.52%	9.64%	
% DIFF	0.20%	-0.65%	-2.35%	-5.42%	-4.25%	-2.97%	-1.99%	-1.27%	-0.80%
NCAT-5	100.00%	74,63%	50.46%	37.59%	27.07%	19.71%	13.81%	9.44%	
Non NCAT-3	99.45%	72.27%	47.95%	32.01%	22.27%	15.76%	10.59%		
% DIFF	0.54%	2.36%	2.52%	5,58%	4.81%	3.95%	3.22%	2.47%	1.87%
NCAT-6	100.00%	75.65%	51.00%	36.76%	25.63%	18.29%	12.65%	8.59%	
Non NCAT-1	99.74%	73,50%	46.45%	33.26%	22.75%	16.09%	11.09%	7.57%	5.33% CONTROL
% DIFF	0.26%	2.15%	4.54%	3.50%	2.88%	2.20%	1.56%	1.02%	0.61%

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	
NCAT-1	99.47%	82.21%	62.56%	38.03%	25.14%	17.44%	11.11%	6.52%	3,17%	EXP
non-NCAT-8	99.50%	79.58%	63.54%	42.81%	30.48%	21.81%	13.73%	7.66%	3.23%	CONTRO
% DIFF	-0.02%	2.63%	-0.98%	-4.78%	-5.34%	-4.38%	-2.62%	-1.13%	-0.06%	•
NCAT-2	98.53%	83.61%	65,02%	42.68%	30.80%	22.54%	14.76%	9.57%	7.91%	EXP
non-NCAT-5	99.50%	80.09%	62.74%	41.40%	28.90%	20.54%	13.15%	7.66%	3.72%	CONTRO
% DIFF	-0.97%	3.52%	2.28%	1.28%	1.90%	2.00%	1.61%	1.91%	4.18%	•
NCAT-3	99,16%	81.68%	64.78%	43,70%	31,90%	23,41%	14.84%	7.91%	3,14%	EXP
non-NCAT-6	99,24%	78.83%	63.42%	43.15%	31.60%	23.12%	14.77%	8.27%	3,63%	CONTRO
% DIFF	-0.07%	2.85%	1.36%	0.55%	0.30%	0.28%	0.06%	-0.35%	-0.49%	•
NCAT-4	100.00%	80,47%	64.06%	42.26%	29.88%	21.37%	13.44%	7.38%	3.15%	EXP
non-NCAT-7	98,59%	82.73%	66.32%	42.41%	28.37%	19.66%	12.50%	7.28%	3.55%	CONTRO
% DIFF	1.41%	-2.26%	-2.27%	-0.15%	1.50%	1.70%	0.94%	0.10%	-0.40%	
% UIFF	1.41%	-2.26%	-2.21%	-0.15%	1.50%	1.70%	U.8476	0.10%	-0,4076	
PAGOSA T	ROUT LA	KES		15 POSSIE	LE COMB	RIONTANI				

PAGOSA 1	ROUT L	AKES		15 POSSIBLE COMBINATIONS							
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200		
NCAT-4	100.00%	76.34%	52.40%	35.85%	25.35%	18.28%	12.53%	8.36%			
Non NCAT-7	99.79%	79.37%	56.00%	38.61%	27.73%	20.00%	13,62%	8.91%		CONTROL	
% DIFF	0.21%	-3.04%	-3.60%	-2.76%	-2.38%	-1.71%	-1.09%	-0.55%	-0.51%		
NCAT-5	100.00%	74.63%	50.46%	37.59%	27,07%	19.71%	13.81%	9.44%	6.61%	EXP	
Non NCAT-8	100.00%	75.03%	50.12%	34.20%	24.37%	17.49%	11.94%	7.99%		CONTROL	
% DIFF	0.00%	-0.40%	0.35%	3.39%	2.70%	2.22%	1.87%	1.45%	0.97%		
	1/2	3/2	#4	#8	#16	#30	#50	#100	#200		
NCAT-4	100.00%	76.34%	52,40%	35.85%	25.35%	18.28%	12.53%	8.36%	5.83%	EXP	
Non NCAT-8	100.00%			34.20%	24.37%	17.49%	11.94%	7.99%	5.64%	CONTROL	
% DIFF	0.00%		2.28%	1.65%	0,99%	0.79%	0.59%	0.37%	0.19%	-	
NCAT-5	100.00%	74.63%	50.46%	37.59%	27.07%	19.71%	13.81%	9.44%	6.61%	EXP	
Non NCAT-7	99.79%	79,37%	56,00%	38.61%	27.73%	20.00%	13.62%	8.91%	6.34%	CONTROL	
% DIFF	0.21%	-4.75%	-5.54%	-1.02%	-0.66%	-0.29%	0.20%	0.53%	0.27%		
NCAT-6	100.00%	75.65%	51.00%	36.76%	25.63%	18.29%	12.65%	8,59%	5.94%	EXP	
Non NCAT-7	99.79%									CONTROL	
% DIFF	0.21%										
NCAT-6	100.00%	75.65%	51.00%								
Non NCAT-8	100.00%	75.03%	50.12%	34.20%						CONTROL	
% DIFF	0.00%	0.62%	0.88%	2.56%	1.26%	0.80%	0.72%	0.60%	0.30%		

### FRANCISCOTTI DIFF. В FRANCISCOTTI AASHTO T 27 FRANCISCOTTI -B STD. DEV. (1S) 0.31% 1.45% STD. DEV. (1S) CONTROL ONLY #8 #16 #30 #50 #100 #200 1.38% 0.64% 0.07% 1.75% 2.57% 1.11% % DIFF. -0.41% -2.63% -2.08% -3.18% -3.93% -3.64% -2.66% -1.71% -1.02% 0.60% 0.43% 0.43% 1,97% 2,53% 2,18% 2.96% 2.59% 1,35% 0.54% 1.78% 0.43% -0.62% -0.59% -0.47% -1.97% -1.82% -1.13% -0.69% -0.62% % DIFF. -0.41% 1.07% 0.43% -2.21% -1.42% -0.91% % DIFF. -0.13% -3.50% -5.02% -5.23% -0.00% 0.66% 2.05% 3.24% 3.02% 2.04% 1.13% 0.55% % DIFF. 0.11% % DIFF. 0.28% -0.87% -2.93% -2.05% -0.58% 0.27% 0.45% 0.30% -2.76% -1.59% -0.83% -0.44% 0.28% -1.53% -3.19% -4.10% -3.81% % DIFF. -0.36% -0.07% -1.64% -2.27% -1.71% -1.18% -0.77% -0.52% MEAN -2.46% RALSTON STD. DEV. 1.78% 0.60% B AASHTO T 27 STD. DEV. (1S) RALSTON DIFF. A RALSTON A-B STD. DEV. (1S) 0.21% #50 #100 #200 1/2 #8 #16 #30 3/8 #4 0.25% 0.36% 1.87% 1.99% 1.55% 0.58% 0.00% 1.20% 0.96% 2.51% 0.95% 0.60% 0.64% 0.60% 0.43% -2.07% -1.08% -0.50% -0.16% % DIFF. 0.12% -1.68% -1.85% -2.79% -2.71% 2.59% 1.98% 1.01% 0.43% 0.43% 0.43% 0.28% 0.13% -0.05% -0.21% -0.00% -1.75% -1.86% 0.21% 0.36% % DIFF. % DIFF. 0.39% -3.83% -2.52% -3.20% -3 26% -2 48% -1.26% -0.68% -0.40% 0.45% -0.05% 3.07% 2.35% 1.22% % DIFF. -0.12% -0.08% -0.01% 3.00% -0.56% -0.41% -0.18% -0.18% -0.24% % DIFF. % DIFF. 0.39% -2.08% -0.66% -3.41% -3.63% -2.76% -1.40% -0.63% -0.19% -0.21% -0.85% -0.43% -0.27% -1.10% -1.12% MEAN 0.17% -1.93% -1.26% VALCO/ROCKY MOUNTAIN/CAS F 0.96% 2.51% 2.59% 1.98% 1.01% 0.12% STD. DEV. 0.21% 1.20% DIFF. VALCO/ROCKY MOUNTAIN/CAS PIT VALCO/ROCKY MOUNTAIN/CAS PIT STD. DEV. (1S) AASHTO T 27 0.36% STD. DEV. (1S) 1.63% 1.38% 0.60% 0.60% 0.60% 0.43% 0.60% 1.25% 1.14% 1.88% 1.81% 0.57% #16 2.34% #30 2.28% 1.86% 1.74% 1.20% 2.02% % DIFF. 2.28% 2.24% 1.17% -0.54% -0.25% 0.43% -0.54% -1.25% -1.19% -0.29% % DIFF. 0.24% 0.26% 0.12% -0.00% 2.86% 1.55% 0.95% 0.54% 0.78% 0.62% 0.38% 0.22% -3.47% -1,74% -0.80% -0.49% % DIFF. -0.25% -1.51% -2.45% -2.56% -3.59% -1.02% -1.07% -1.80% -1.50% -0.58% -0.13% -0.02% 1.97% 1.16% 0.68% 0.47% -0.24% 1.43% 1.49% 1.79% % DIFF. 2.60%

**DATA USED TO GENERATE FIG. 7** 

-0.19% 2.24%

2.28%

1.18% 1.63%

1.86%

1.74%

0.36%

STD. DEV.

0.06% 0.56%

0.02%

1.17%

0.03% 0.35%

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	A B	DIFF.
% DIFF.	0.30%	-0.98%	-0.30%	-1. <b>14</b> %	-0.21%	0.12%	-0.02%	-0.28%	-0.50%	IRWIN/ WINDSOR / STUTE STD. DEV. (15) AASHTO T 27 0.35% STD. DEV. (15) 3.79% 0.95% 2.93% 0.64%	2.84% 2.29%
% DIFF.	0.00%	4.79%	3.32%	0.84%	1.41%	1.97%	1.55%	0.83%	0.32%	1.72% 0.60% 1.87% 0.60% 2.08% 0.43% 1.53% 0.43%	1 12% 1 27% 1 65% 1 10%
% DIFF.	0.60%	0.29%	-0.89%	-1.82%	-1.72%	-1.36%	-0.82%	-0.53%	-0.36%	0.91% 0.43% 0.57% 0.43%	G:48% G:14%
% DIFF.	-0.30%	5.77%	- 3,62%	1.98%	1.61%	1.85%	1.57%	1.11%	0.81%		
% DIFF.	0.30%	1.27%	-0.59%	-0.68%	-1.51%	-1.48%	-0.81%	-0.25%	0.14%		
% DIFF.	0.60%	-4.50%	-4.21%	-2.66%	-3.12%	-3.33%	-2.38%	-1.36%	-0.67%		
MEAN STD. DEV.	0.25% 0.35% MONK I	3.79%					-0.15% 1.53%		-0.04% 0.57%	A B  MONK PIT  STD. DEV. (1S) AASHTO T 27  0.65% STD. DEV. (1S)	MONK PIT DIFF.
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200	2.59% 0.95%	1.64%
% DIFF.	0.27%	1.26%	-0.68%	-1.75%	-2.70%	-2.58%	-1.62%	-0.60%	0.09%	2.26% 0.60% 0.98% 0.64% 2.27% 0.60% 2.34% 0.43% 1.49% 0.43% 0.60% 0.43%	1.66% 0.34% 1.67% 1.91% 1.06% 0.17%
% DIFF.	0.91%	-2.64%	-3.58%	-1.01%	0.52%	0.88%	0.65%	0.38%	0.17%	0.17% 0.43%	-0.2 <b>6%</b>
% DIFF.	0.01%	0.52%	-0.80%	-1.41%	-1.58%	-1.27%	-0.58%	0.01%	0.49%		
% DIFF.	0.65%	-3.90%	-2.90%	0.74%	3.22%	3,46%	2.27%	0.99%	0.08%		
% DIFF.	-0.26%	-0.75%	-0.12%	0.34%	1.12%	1.31%	1.04%	0.61%	0.40%		
% DIFF.	-0.91%	3.15%	2.78%	-0.40%	-2.10%	-2.15%	-1.23%	-0.38%	0.32%		
MEAN STD. DEV.	0.11% 0.65%										

FRANCISCO	ATTI								
CONTROL		3/8	#4	#8	#16	#30	#50	#100	#200
% DIFF.	-0.41%	-2.63%	-2.08%	-3.18%	-3.93%	-3.64%	-2.66%	-1.71%	-1.02%
% DIFF.	-0.41%	-1.97%	-1.82%	-1.13%	-0.69%	-0.62%	-0.62%	-0.59%	-0.47%
% DIFF.	-0.13%	-3.50%	-5.02%	-5.23%	-4.51%	-3.38%	-2.21%	-1.42%	-0.91%
% DIFF.	-0.00%	0.66%	0.26%	2.05%	3.24%	3.02%	2.04%	1.13%	0.55%
% DIFF.	0.28%	-0.87%	-2.93%	-2.05%	-0.58%	0.27%	0.45%	0.30%	0.11%
% DIFF.	0.28%	-1.53%	-3.19%	-4.10%	-3.81%	<b>-2.76%</b>	-1.59%	-0.83%	-0.44%
MEAN STD. DEV.	-0.07% 0.31%	-1.64% 1.45%	-2.46% 1.75%	-2.27% 2.57%	-1.71% 2.96%	-1.18% 2.59%	-0.77% 1.78%	-0.52% 1.07%	-0.36% 0.60%
	RALSTON								
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
% DIFF.	0.12%	-1.68%	-1.85%	-2.79%	-2.71%	-2.07%	-1.08%	-0.50%	-0.16%
% DIFF.	-0.00%	-1.75%	-1.86%	0.21%	0.36%	0.28%	0.13%	-0.05%	-0.21%
% DIFF.	0.39%	-3.83%	-2.52%	-3.20%	-3.26%	-2.48%	-1.26%	-0.68%	-0.40%
% DIFF.	-0.12%	-0.08%	-0.01%	3.00%	3.07%	2.35%	1.22%	0.45%	-0.05%
% DIFF.	0.27%	-2.16%	-0.67%	-0.42%	-0.56%	-0.41%	-0.18%	-0.18%	-0.24%
% DIFF.	0.39%	-2.08%	-0.66%	-3.41%	-3.63%	-2.76%_	-1.40%	-0.63%	-0.19%

-0.85%

1.98%

-0.43%

1.01%

-0.27%

0.43%

-0.21%

0.12%

-1.12%

2.59%

-1.10%

2.51%

-1.26%

0.96%

MEAN

STD. DEV.

-1.93%

1.20%

0.17%

0.21%

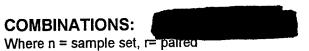
# VALCO/ROCKY MOUNTAIN/CAS PIT

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
% DIFF.	0.49%	1.77%	2.57%	2.02%	2.34%	2.28%	1.20%	0.51%	0.24%
% DIFF.	0.24%	0.26%	0.12%	-0.54%	-1.25%	-1.19%	-0.54%	-0.29%	-0.25%
% DIFF.	-0.00%	2.86%	1.55%	0.95%	0.54%	0.78%	0.62%	0.38%	0.22%
% DIFF.	-0.25%	-1.51%	-2.45%	-2.56%	-3.59%	-3.47%	-1.74%	-0.80%	-0.49%
% DIFF.	-0.49%	1.09%	-1.02%	-1.07%	-1.80%	-1.50%	-0.58%	-0.13%	-0.02%
70 DIFF.	-0.4370	1.09%	-1.0276	-1.07 70	-1.0070	-1.5070	-0.0070	-0.1070	0.0270
	2.244	0.000/	4.4007	4 4007	4 700/	4.070/	4 460/	0.690/	0.470/
% DIFF.	-0.24%	2.60%	1.43%	1.49%	1.79%	1.97%	1.16%	0.68%	0.47%
MEAN STD. DEV.	-0.04% 0.36%	1.18% 1.63%	0.37% 1.86%	0.05% 1.74%	-0.33% 2.28%		0.02% 1.17%	0.06% 0.56%	0.03% 0.35%
	IDVA/IBI/ I	WINDSOF	/ CTUT	=					
	ILCANIIA' A	MINDSOF	(/3101	_					
	1/2				#16	#30	#50	#100	#200
e/ DIEE	1/2	3/8	#4	#8					
% DIFF.	1/2		#4	#8					
	1 <b>/2</b> 0.30%	<b>3/8</b> -0.98%	<b>#4</b> -0.30%	#8 -1.14%	-0.21%	0.12%	-0.02%	-0.28%	-0.50%
% DIFF.	1 <b>/2</b> 0.30%	3/8	<b>#4</b> -0.30%	#8 -1.14%		0.12%	-0.02%	-0.28%	
	1 <b>/2</b> 0.30%	<b>3/8</b> -0.98%	<b>#4</b> -0.30%	#8 -1.14%	-0.21% 1.41%	0.12% 1.97%	-0.02% 1.55%	-0.28% 0.83%	-0.50% 0.32%
	1 <b>/2</b> 0.30%	<b>3/8</b> -0.98% 4.79%	<b>+4</b> -0.30% 3.32%	#8 -1.14% 0.84%	-0.21% 1.41%	0.12% 1.97%	-0.02%	-0.28% 0.83%	-0.50% 0.32%
% DIFF.	0.30%	<b>3/8</b> -0.98% 4.79%	<b>+4</b> -0.30% 3.32%	#8 -1.14% 0.84%	-0.21% 1.41%	0.12% 1.97%	-0.02% 1.55%	-0.28% 0.83%	-0.50% 0.32%
% DIFF.	0.30%	3/8 -0.98% 4.79% 0.29%	<b>+4</b> -0.30% 3.32%	#8 -1.14% 0.84% -1.82%	-0.21% 1.41%	0.12% 1.97% -1.36%	-0.02% 1.55%	-0.28% 0.83% -0.53%	-0.50% 0.32% -0.36%
% DIFF.	0.30% 0.00% 0.60%	3/8 -0.98% 4.79% 0.29%	-0.30% 3.32% -0.89%	#8 -1.14% 0.84% -1.82%	-0.21% 1.41% -1.72%	0.12% 1.97% -1.36%	-0.02% 1.55% -0.82%	-0.28% 0.83% -0.53%	-0.50% 0.32% -0.36%
% DIFF.	0.30% 0.00% 0.60%	3/8 -0.98% 4.79% 0.29% 5.77%	-0.30% 3.32% -0.89% 3.62%	#8 -1.14% 0.84% -1.82% 1.98%	-0.21% 1.41% -1.72% 1.61%	0.12% 1.97% -1.36% 1.85%	-0.02% 1.55% -0.82% 1.57%	-0.28% 0.83% -0.53% 1.11%	-0.50% 0.32% -0.36% 0.81%
% DIFF. % DIFF.	0.30% 0.00% 0.60% -0.30%	3/8 -0.98% 4.79% 0.29% 5.77%	-0.30% 3.32% -0.89% 3.62%	#8 -1.14% 0.84% -1.82% 1.98%	-0.21% 1.41% -1.72% 1.61%	0.12% 1.97% -1.36% 1.85%	-0.02% 1.55% -0.82% 1.57%	-0.28% 0.83% -0.53% 1.11%	-0.50% 0.32% -0.36% 0.81%
% DIFF. % DIFF.	0.30% 0.00% 0.60% -0.30%	3/8 -0.98% 4.79% 0.29% 5.77% 1.27%	-0.30% 3.32% -0.89% 3.62% -0.59%	#8 -1.14% 0.84% -1.82% 1.98%	-0.21% 1.41% -1.72% 1.61% -1.51%	0.12% 1.97% -1.36% 1.85%	-0.02% 1.55% -0.82% 1.57% -0.81%	-0.28% 0.83% -0.53% 1.11% -0.25%	-0.50% 0.32% -0.36% 0.81% 0.14%
% DIFF. % DIFF.	0.30% 0.00% 0.60% -0.30%	3/8 -0.98% 4.79% 0.29% 5.77% 1.27%	-0.30% 3.32% -0.89% 3.62% -0.59%	#8 -1.14% 0.84% -1.82% 1.98% -0.68%	-0.21% 1.41% -1.72% 1.61% -1.51%	0.12% 1.97% -1.36% 1.85%	-0.02% 1.55% -0.82% 1.57% -0.81%	-0.28% 0.83% -0.53% 1.11% -0.25%	-0.50% 0.32% -0.36% 0.81% 0.14%
% DIFF. % DIFF.	0.30% 0.00% 0.60% -0.30%	3/8 -0.98% 4.79% 0.29% 5.77% 1.27%	-0.30% 3.32% -0.89% 3.62% -0.59%	#8 -1.14% 0.84% -1.82% 1.98% -0.68% -2.66%	-0.21%  1.41%  -1.72%  1.61%  -1.51%	0.12% 1.97% -1.36% 1.85% -1.48%	-0.02%  1.55%  -0.82%  1.57%  -0.81%  -2.38%	-0.28%  0.83%  -0.53%  1.11%  -0.25%  -1.36%	-0.50%  0.32%  -0.36%  0.81%  0.14%  -0.67%

# MONK PIT

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
% DIFF.	0.27%	1.26%	-0.68%	-1.75%	-2.70%	-2.58%	-1.62%	-0.60%	0.09%
% DIFF.	0.91%	-2.64%	-3.58%	-1.01%	0.52%	0.88%	0.65%	0.38%	0.17%
% DIFF.	0.01%	0.52%	-0.80%	-1.41%	-1.58%	-1.27%	-0.58%	0.01%	0.49%
% DIFF.	0.65%	-3.90%	-2.90%	0.74%	3.22%	3.46%	2.27%	0.99%	0.08%
% DIFF.	-0.26%	-0.75%	-0.12%	0.34%	1.12%	1.31%	1.04%	0.61%	0.40%
% DIFF.	-0.91%	3.15%	2.78%	-0.40%	-2.10%	-2.15%	-1.23%	-0.38%	0.32%
MEAN STD. DEV.	0.11% 0.65%	-0.39% 2.59%	-0.88% 2.26%	-0.58% 0.98%	-0.25% 2.27%	-0.06% 2.34%	0.09% 1.49%	0.17% 0.60%	0.26% 0.17%
	PAGOSA	TROUT	LAKES						
	1/2	3/8	#4 :	#8	#16	#30	#50	#100	#200
% DIFF.	-0.06%	-3.49%	-8.30%	-8.01%	-6.85%	-5.16%	-3.43%	-2.07%	-1.30%
% DIFF.	-0.33%	-7.11%	<b>-</b> 8. <b>05</b> %	-6.60%	-5.47%	-4.24%	-3.02%	-1.94%	-1.60%
% DIFF.	-0.26%	-1.53%	-3.66%	-0.94%	<b>-1.62</b> %	-1.40%	-0.85%	-0.42%	-0.31%
% DIFF.	-0.05%	-5.88%	-9.55%	-5.35%	-4.98%	-3.91%	-2.53%	-1.34%	-1.01%
% DIFF.	0.01%	-2.39%	-1.25%	2.66%	1.87%	1.25%	0.90%	0.73%	0.29%
% DIFF.	-0.20%	1.96%	4.63%	7.07%	5.23%	3.76%	2. <del>5</del> 8%	1.65%	0.99%
% DIFF.	-0.54%	-2.76%	-2.17%	<b>-</b> 2.19%	-2.10%	-1.74%	-1.34%	-1.02%	-0.90%
% DIFF.	-0.21%	4.34%	5.88%	4.41%	3.36%	2.51%	1.68%	0.92%	0.70%
% DIFF.	0.34%	4.72%	6.81%	9.26%	7.33%	5.49%	3.92%	2.67%	1.89%
% DIFF.	0.28%	1.23%	-1.49%	1.25%	0.48%	0.33%	0.50%	0.60%	0.59%
MEAN STD. DEV.	-0.10% 0.27%	-1.09% 4.05%		0.16% 5.83%	-0.27% 4.76%				





# **6 COMBINATIONS PER AGGREGATE SOURCE**

# FRANCISCOTTI **CONTROL SPECIMENS**

CONTINO	L OI LOIMI	_110							
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
596X-5	99.59%	67.61%	42.44%	30.68%	22.43%	15.40%	9.78%	6.16%	3.78%
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	19.04%	12.45%	7.88%	4.80%
% DIFF.	-0.41%	-2.63%	-2.08%	-3.18%	-3.93%	-3.64%	-2.66%	-1.71%	-1.02%
596X-5	99.59%	67.61%	42.44%	30.68%	22.43%	15.40%	9.78%	6.16%	3.78%
596X-7	100.00%	69.59%	44.26%	31.81%	23.13%	16.02%	10.40%	6.75%	4.25%
% DIFF.	-0.41%	-1.97%	-1.82%	-1.13%	-0.69%	-0.62%	-0.62%	-0.59%	-0.47%
596X-5	99.59%	67.61%	42.44%	30.68%	22.43%	15.40%	9.78%	6.16%	3.78%
596X-8	99.72%	71.11%	47.45%	35.91%	26.94%	18.78%	12.00%	7.58%	4.69%
% DIFF.	-0.13%	-3.50%	-5.02%	-5.23%	-4.51%	-3.38%	-2.21%	-1.42%	-0.91%
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	19.04%	12.45%	7.88%	4.80%
596X-7	100.00%	69.59%	44.26%	31.81%	23.13%	16.02%	10.40%	6.75%	4.25%
% DIFF.	-0.00%	0.66%	0.26%	2.05%	3.24%	3.02%	2.04%	1.13%	0.55%
596X-6	100.00%	70.25%	44.52%	33.86%	26.36%	19.04%	12.45%	7.88%	4.80%
596X-8	99.72%	71.11%	47.45%	35.91%	26.94%	18.78%	12.00%	7.58%	4.69%
% DIFF.	0.28%	-0.87%	-2.93%	-2.05%	-0.58%	0.27%	0.45%	0.30%	0.11%
596X-7	100.00%	69.59%	44.26%	31.81%	23.13%	16.02%	10.40%	6.75%	4.25%
596X-8	99.72%	71.11%	47.45%	35.91%	26.94%	18.78%	12.00%	7.58%	4.69%
% DIFF.	0.28%	-1.53%	-3.19%	-4.10%	-3.81%	-2.76%	-1.59%	-0.83%	-0.44%

# **RALSTON** CONTROL

SIEVE SIZE	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
non-NCAT-5	99.08%	77.93%	64.19%	39.97%	25.14%	15.68%	8.22%	4.54%	2.43%
non-NCAT-6	98.96%	79.61%	66.04%	42.76%	27.84%	17.75%	9.30%	5.04%	2.59%
% DIFF.	0.12%	-1.68%	-1.85%	-2.79%	-2.71%	-2.07%	-1.08%	-0.50%	-0.16%
non-NCAT-5	99.08%	77.93%	64.19%	39.97%	25.14%	15.68%	8.22%	4.54%	2.43%
non-NCAT-7	99.08%	79.69%	66.05%	39.76%	24.77%	15.39%	8.08%	4.60%	2.63%
% DIFF.	-0.00%	-1.75%	-1.86%	0.21%	0.36%	0.28%	0.13%	-0.05%	-0.21%
non-NCAT-5	99.08%	77.93%	64.19%	39.97%	25.14%	15.68%	8.22%	4.54%	2.43%
non-NCAT-8	98.69%	81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2.83%

% DIFF.	0.39%	-3.83%	-2.52%	3.20%	-3.26%	-2.48%	-1.26%	-0.68%	-0.40%
non-NCAT-6	98.96%	<b>7</b> 0.61%	66.04%	<b>42.76%</b>	27.84%	17.75%	9.30%	5.04%	2.59%
non-NCAT-7	99.08%	79.69%	66.05%	39.76%	24.77%	15.39%	8.08%	4.60%	2.63%
% DIFF.	-0.12%	-0.08%	-0.01%	3.00%	3.07%	2.35%	1.22%	0.45%	-0.05%
non-NCAT-6	98.96%	79.61%	66.04%	42.76%	27.84%	17.75%	9.30%	5.04%	2.59%
non-NCAT-8	98.69%	81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2.83%
% DIFF.	0.27%	<b>-</b> 2.16%	-0.67%	-0.42%	-0.56%	-0.41%	-0.18%	-0.18%	-0.24%
non-NCAT-7	99.08%	79.69%	66.05%	39.76%	24.77%	15.39%	8.08%	4.60%	2.63%
non-NCAT-8	98.69%	81.77%	66.71%	43.18%	28.40%	18.15%	9.48%	5.22%	2.83%
% DIFF.	0.39%	-2.08%	-0.66%	-3.41%	-3.63%	-2.76%	-1.40%	-0.63%	-0.19%

# **VALCO/ROCKY MOUNTAIN/CAS PIT:**

# CONTROL

				""	"40	400	450	4400	4000
	/2	3/8	#4	#8	#16	#30	#50	#100	#200
NON NCAT-5 1	100.00%	75.67%	61.68%	45.32%	35.54%	26.49%	12.05%	5.00%	2.78%
NON NCAT-6	99.51%	73.90%	59.11%	43.30%	33.20%	24.21%	10.84%	4.49%	2.54%
% DIFF.	0.49%	1.77%	2.57%	2.02%	2.34%	2.28%	1.20%	0.51%	0.24%
NON NCAT-€ 1	100.00%	75.67%	61.68%	45.32%	35.54%	26.49%	12.05%	5.00%	2.78%
<b>NON NCAT-7</b>	99.76%	75.41%	61.56%	45.86%	36.79%	27.68%	12.58%	5.29%	3.03%
% DIFF.	0.24%	0.26%	0.12%	-0.54%	-1.25%	-1.19%	-0.54%	-0.29%	-0.25%
NON NCAT-5	100.00%	75.67%	61.68%	45.32%	35.54%	26.49%	12.05%	5.00%	2.78%
NON NCAT-8	100.00%	72.81%	60.13%	44.37%	35.00%	25.71%	11.43%	4.61%	2.56%
% DIFF.	-0.00%	2.86%	1.55%	0.95%	0.54%	0.78%	0.62%	0.38%	0.22%
NON NCAT-6	99.51%	73.90%	59.11%	43.30%	33.20%	24.21%	10.84%	4.49%	2.54%
NON NCAT-7	99.76%	75.41%	61.56%	45.86%	36.79%	27.68%	12.58%	5.29%	3.03%
% DIFF.	-0.25%	-1.51%	-2.45%	-2.56%	-3.59%	-3.47%	-1.74%	-0.80%	-0.49%
NON NCAT-E	99.51%	73.90%	59.11%	43.30%	33.20%	24.21%	10.84%	4.49%	2.54%
NON NCAT-8	100.00%	72.81%	60.13%	44.37%	35.00%	25.71%	11.43%	4.61%	2.56%
% DIFF.	-0.49%	1.09%	-1.02%	-1.07%	-1.80%	-1.50%	-0.58%	-0.13%	-0.02%
-									
NON NCAT-7	99.76%	75.41%	61.56%	45.86%	36.79%	27.68%	12.58%	5.29%	3.03%
	100.00%	72.81%	60.13%	44.37%	35.00%	25.71%	11.43%	4.61%	2.56%
% DIFF.	-0.24%	2.60%	1.43%	1.49%	1.79%	1.97%	1.16%	0.68%	0.47%

# **Irwin Windsor/Stute Pit:**

# CONTROL

	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
NON NCAT-	100.00%	80.67%	59.97%	43.01%	31.60%	22.14%	13.88%	8.29%	4.99%
NON NCAT-		81.64%	60.27%	44.14%	31.81%	22.03%	13.90%	8.57%	5.49%
% DIFF.	0.30%	-0.98%	-0.30%	-1.14%	-0.21%	0.12%	-0.02%	-0.28%	-0.50%
NON NCAT-	E 100.00%	80.67%	59.97%	43.01%	31.60%	22.14%		8.29%	
NON NCAT-	7 100.00%	75.87%	56.65%	42.17%	30.19%	20.18%		7.46%	
% DIFF.	0.00%	4.79%	3.32%	0.84%	1.41%	1.97%	1.55%	0.83%	0.32%
NON NCAT-	5 100.00%	80.67%	59.97%	43.01%	31.60%				
NON NCAT-	8 99.40%	80.37%	60.86%	44.82%	33.32%				
% DIFF.	0.60%	0.29%	-0.89%	-1.82%	-1.72%	-1.36%	-0.82%	-0.53%	-0.36%
NON NCAT-	€ 99.70%	81.64%	60.27%	44.14%					
<b>NON NCAT-</b>	7 100.00%	75.87%	56.65%						
% DIFF.	-0.30%	5.77%	3.62%	1.98%	1.61%	1.85%	1.57%	1.11%	0.81%
									- 4-04
NON NCAT-	€ 99.70%	81.64%	60.27%						
NON NCAT-	<b>8</b> 99.40%	80.37%	60.86%	44.82%					
% DIFF.	0.30%	1.27%	-0.59%	-0.68%	-1.51%	-1.48%	-0.81%	-0.25%	0.14%
							40.000/	7 400/	4.070/
NON NCAT-									
NON NCAT-									
% DIFF.	0.60%	-4.50%	-4.21%	-2.66%	-3.12%	-3.33%	-2.38%	-1.36%	-0.67%

# MONK PIT: CONTROL

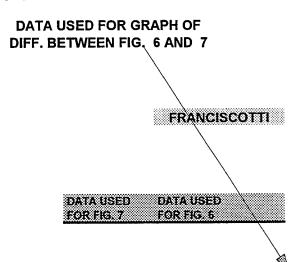
1/2	3/8	#4	#8	#16				#200
99.50%	80.09%	62.74%	41.40%	28.90%	20.54%	13.15%	7.66%	3.72%
99.24%	78.83%	63.42%	43.15%	31.60%	23.12%	14.77%	8.27%	3.63%
0.27%	1.26%	-0.68%	-1.75%	-2.70%	-2.58%	-1.62%	-0.60%	0.09%
99.50%	80.09%	62.74%	41.40%	28.90%	20.54%	13.15%		3.72%
98.59%	82.73%	66.32%	42.41%	28.37%	19.66%	12.50%		3.55%
0.91%	-2.64%	-3.58%	-1.01%	0.52%	0.88%	0.65%	0.38%	0.17%
99.50%	80.09%	62.74%	41.40%	28.90%	20.54%	13.15%		3.72%
99.50%	79.58%	63.54%	42.81%	30.48%	21.81%	13.73%	7.66%	3.23%
0.01%	0.52%	-0.80%	-1.41%	-1.58%	-1.27%	-0.58%	0.01%	0.49%
99.24%	78.83%	63.42%	43.15%	31.60%	23.12%			3.63%
98.59%	82.73%	66.32%	42.41%	28.37%	19.66%			3.55%
0.65%	-3.90%	-2.90%	0.74%	3.22%	3.46%	2.27%	0.99%	0.08%
99.24%	78.83%	63.42%	43.15%	31.60%	23.12%			3.63%
99.50%	79.58%	63.54%	42.81%	30.48%	21.81%			3.23%
-0.26%	-0.75%	-0.12%	0.34%	1.12%	1.31%	1.04%	0.61%	0.40%
00 500/	02 720/	66 220/	A2 A10/	28 37%	10 66%	12.50%	7 28%	3.55%
	99.50% 99.24% 0.27% 99.50% 98.59% 0.91% 99.50% 0.01% 99.24% 98.59% 0.65% 99.24% 99.50% -0.26%	99.50%       80.09%         99.24%       78.83%         0.27%       1.26%         99.50%       80.09%         98.59%       82.73%         0.91%       -2.64%         99.50%       79.58%         0.01%       0.52%         99.24%       78.83%         98.59%       82.73%         0.65%       -3.90%         99.24%       78.83%         99.50%       79.58%         -0.26%       -0.75%	99.50%         80.09%         62.74%           99.24%         78.83%         63.42%           0.27%         1.26%         -0.68%           99.50%         80.09%         62.74%           98.59%         82.73%         66.32%           0.91%         -2.64%         -3.58%           99.50%         80.09%         62.74%           99.50%         79.58%         63.54%           0.01%         0.52%         -0.80%           99.24%         78.83%         63.42%           98.59%         82.73%         66.32%           0.65%         -3.90%         -2.90%           99.24%         78.83%         63.42%           99.50%         79.58%         63.54%           -0.26%         -0.75%         -0.12%	99.50%         80.09%         62.74%         41.40%           99.24%         78.83%         63.42%         43.15%           0.27%         1.26%         -0.68%         -1.75%           99.50%         80.09%         62.74%         41.40%           98.59%         82.73%         66.32%         42.41%           0.91%         -2.64%         -3.58%         -1.01%           99.50%         80.09%         62.74%         41.40%           99.50%         79.58%         63.54%         42.81%           0.01%         0.52%         -0.80%         -1.41%           99.24%         78.83%         63.42%         43.15%           98.59%         82.73%         66.32%         42.41%           0.65%         -3.90%         -2.90%         0.74%           99.24%         78.83%         63.42%         43.15%           99.50%         79.58%         63.54%         42.81%           -0.26%         -0.75%         -0.12%         0.34%	99.50%         80.09%         62.74%         41.40%         28.90%           99.24%         78.83%         63.42%         43.15%         31.60%           0.27%         1.26%         -0.68%         -1.75%         -2.70%           99.50%         80.09%         62.74%         41.40%         28.90%           98.59%         82.73%         66.32%         42.41%         28.37%           0.91%         -2.64%         -3.58%         -1.01%         0.52%           99.50%         80.09%         62.74%         41.40%         28.90%           99.50%         79.58%         63.54%         42.81%         30.48%           0.01%         0.52%         -0.80%         -1.41%         -1.58%           99.24%         78.83%         63.42%         43.15%         31.60%           98.59%         82.73%         66.32%         42.41%         28.37%           0.65%         -3.90%         -2.90%         0.74%         3.22%           99.24%         78.83%         63.42%         43.15%         31.60%           99.50%         79.58%         63.54%         42.81%         30.48%           -0.26%         -0.75%         -0.12%         0.34%	99.50%         80.09%         62.74%         41.40%         28.90%         20.54%           99.24%         78.83%         63.42%         43.15%         31.60%         23.12%           0.27%         1.26%         -0.68%         -1.75%         -2.70%         -2.58%           99.50%         80.09%         62.74%         41.40%         28.90%         20.54%           98.59%         82.73%         66.32%         42.41%         28.37%         19.66%           0.91%         -2.64%         -3.58%         -1.01%         0.52%         0.88%           99.50%         80.09%         62.74%         41.40%         28.90%         20.54%           99.50%         79.58%         63.54%         42.81%         30.48%         21.81%           0.01%         0.52%         -0.80%         -1.41%         -1.58%         -1.27%           99.24%         78.83%         63.42%         43.15%         31.60%         23.12%           98.59%         82.73%         66.32%         42.41%         28.37%         19.66%           0.65%         -3.90%         -2.90%         0.74%         3.22%         3.46%           99.24%         78.83%         63.42%         43.15%	99.50%         80.09%         62.74%         41.40%         28.90%         20.54%         13.15%           99.24%         78.83%         63.42%         43.15%         31.60%         23.12%         14.77%           0.27%         1.26%         -0.68%         -1.75%         -2.70%         -2.58%         -1.62%           99.50%         80.09%         62.74%         41.40%         28.90%         20.54%         13.15%           98.59%         82.73%         66.32%         42.41%         28.37%         19.66%         12.50%           0.91%         -2.64%         -3.58%         -1.01%         0.52%         0.88%         0.65%           99.50%         80.09%         62.74%         41.40%         28.90%         20.54%         13.15%           99.50%         79.58%         63.54%         42.81%         30.48%         21.81%         13.73%           0.01%         0.52%         -0.80%         -1.41%         -1.58%         -1.27%         -0.58%           99.24%         78.83%         63.42%         43.15%         31.60%         23.12%         14.77%           98.59%         82.73%         66.32%         42.41%         28.37%         19.66%         12.50%     <	99.50%         80.09%         62.74%         41.40%         28.90%         20.54%         13.15%         7.66%           99.24%         78.83%         63.42%         43.15%         31.60%         23.12%         14.77%         8.27%           0.27%         1.26%         -0.68%         -1.75%         -2.70%         -2.58%         -1.62%         -0.60%           99.50%         80.09%         62.74%         41.40%         28.90%         20.54%         13.15%         7.66%           98.59%         82.73%         66.32%         42.41%         28.37%         19.66%         12.50%         7.28%           0.91%         -2.64%         -3.58%         -1.01%         0.52%         0.88%         0.65%         0.38%           99.50%         80.09%         62.74%         41.40%         28.90%         20.54%         13.15%         7.66%           99.50%         79.58%         63.54%         42.81%         30.48%         21.81%         13.73%         7.66%           99.24%         78.83%         63.42%         43.15%         31.60%         23.12%         14.77%         8.27%           98.59%         82.73%         66.32%         42.41%         28.37%         19.66%

NON NCAT-8	99.50%	79.58%	63.54%	42.81%	30.48%	21.81%	13.73%	7.66%	3.23%
% DIFF	-0.91%	3 15%	2 78%	-0.40%	-2 10%	-2 15%	-1 23%	-0.38%	0.32%

# **PAGOSA TROUT LAKES**

PAGUSA I	KOU I L	ANES							
CONTROL									
	1/2	3/8	#4	#8	#16	#30	#50	#100	#200
Non NCAT-1	99.74%	73.50%	46.45%	33.26%	22.75%	16.09%	11.09%	7.57%	5.33%
Non NCAT-2	99.80%	76.99%	54.75%	41.27%	29.60%	21.25%	14.52%	9.64%	6.63%
% DIFF.	-0.06%	-3.49%	-8.30%	-8.01%	-6.85%	-5.16%	-3.43%	-2.07%	-1.30%
Non NCAT-3	99.46%	72.27%	47.95%	32.01%	22.27%	15.76%	10.59%	6.97%	4.74%
Non NCAT-7	99.79%		56.00%	38.61%	27.73%		13.62%	8.91%	6.34%
% DIFF.	-0.33%	-7.11%	-8.05%	-6.60%	-5.47%	-4.24%	-3.02%	-1.94%	-1.60%
						40.000/	44.000/	7 570/	5.000/
Non NCAT-1	99.74%		46.45%	33.26%	22.75%		11.09%	7.57%	5.33%
Non NCAT-8	100.00%			34.20%	24.37%		11.94%	7.99%	5.64%
% DIFF.	-0.26%	-1.53%	-3.66%	-0.94%	-1.62%	-1.40%	-0.85%	-0.42%	-0.31%
Non NOAT 4	00.740/	70 500/	AC AE0/	33.26%	22.75%	16.09%	11.09%	7.57%	5.33%
Non NCAT-1	99.74%						13.62%	8.91%	
Non NCAT-7	99.79%								
% DIFF.	-0.05%	-5.00%	-9.55%	-5.55%	-4.90%	-3.5170	-2.55%	-1.5470	-1.0170
Non NCAT-2	99.80%	76.99%	54.75%	41.27%	29.60%	21.25%	14.52%	9.64%	6.63%
Non NCAT-7	99.79%								
% DIFF.	0.01%								
70 Dit 1 .	0.0170	··· 2	1.22070	2.0070	1.07 70	1.2070	0.0070	00	0.2070
Non NCAT-2	99.80%	76.99%	54.75%	41.27%	29.60%	21.25%	14.52%	9.64%	6.63%
Non NCAT-8	100.00%						11.94%	7.99%	5.64%
% DIFF.	-0.20%						2.58%	1.65%	0.99%
Non NCAT-3	99.46%	72.27%	47.95%	32.01%	22.27%	15.76%	10.59%	6.97%	4.74%
Non NCAT-8	100.00%	75.03%	50.12%	34.20%	24.37%	17.49%	11.94%	7.99%	5.64%
% DIFF.	-0.54%	-2.76%	-2.17%	-2.19%	-2.10%	-1.74%	-1.34%	-1.02%	-0.90%
Non NCAT-7	99.79%								
Non NCAT-8	100.00%								
% DIFF.	-0.21%	4.34%	5.88%	4.41%	3.36%	2.51%	1.68%	0.92%	0.70%
							===.		
Non NCAT-2	99.80%								
Non NCAT-3	99.46%								
% DIFF.	0.34%	4.72%	6.81%	9.26%	7.33%	5.49%	3.92%	2.67%	1.89%
	00 = 10	70 200	40 450	00.000	00 750	40.000	44.000	-7 F-70/	E 000/
Non NCAT-1	99.74%								
Non NCAT-3	99.46%								
% DIFF.	0.28%	1.23%	-1.49%	1.25%	0.48%	0.33%	0.50%	0.60%	U.38%

FIGURE 8



SIEVE SIZE	PRECISION (1S),%	PRECISION (1S),%	FIG. 7 - 6
1/2			
3/8	0.07	0.13	-0.06
#4	1.1	1.29	-0,19
#8	1.97	1.52	0.45
#16	2.53	1.68	0.85
#30	2.16	0.77	1.39
#50	1.35	0.76	0,59
#100	0.64	0.30	0.34
#200	0.46	0.31	0.15

# RALSTON

SIEVE SIZE			
1/2			
3/8	0.25	0.82	-0.57
#4	0.36	1.2	-0.84
#8	1.87	1.66	0.21
#16	1.99	1.52	0.47
#30	1. <b>5</b> 5	1.29	0.26
#50	0.58	0.58	+0.00
#100	0	0.11	-0.11
#200	-0.2	0.15	-0.35

# VALCO/ROCKY MOUNTAIN/CAS PIT

SIEVE SIZE			
1/2			
3/8	0.25	0.97	-0.72
#4	1.26	1.69	-0.43
#8	1.14	1.46	-0.32
#16	1.68	1.44	0.24
#30	1.81	1.38	0.43
#50	0.57	0.28	0.29
#100	0.13	-0.05	0.18
#200	0.21	0.07	0.14

FIGURE 8

# DATA USED FOR GRAPH OF DIFF. BETWEEN FIG. 6 AND 7

# IRWIN/ WINDSOR / STUTE

SIEVE SIZE			
1/2			
3/8	2.84	1.68	1,16
#4	2.29	1.33	0.96
#8	1.12	1.1	0.02
#16	1.27	1.41	-0.14
#30	1.65	1.51	0.14
#50	1.1	0.92	0.18
#100	0.48	0.35	0.13
#200	0.14	0.02	0.12

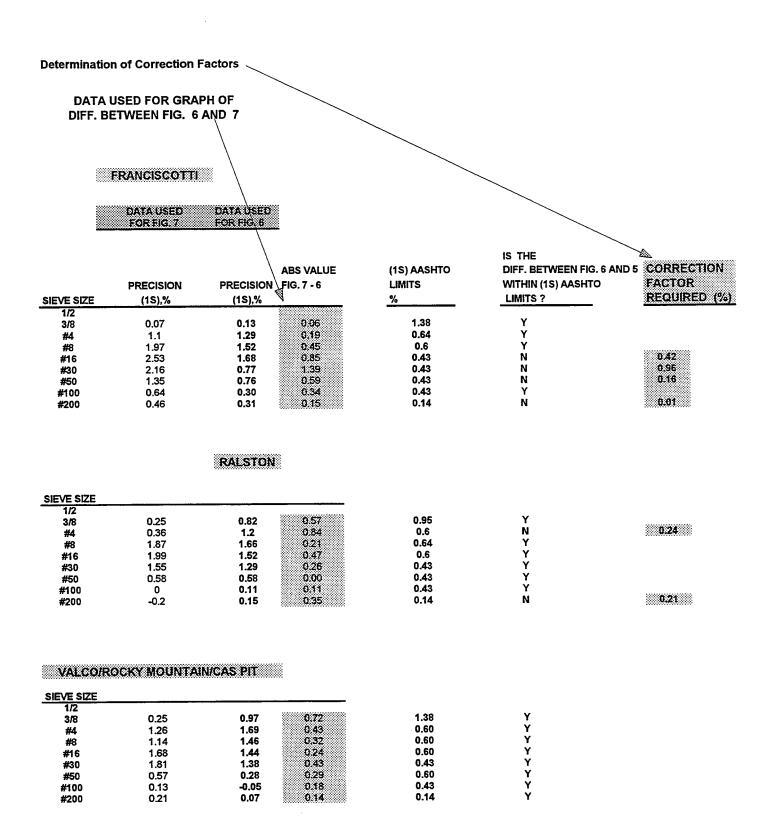
# **MONK PIT**

SIEVE SIZE			
1/2			
3/8	1.64	0.96	0.68
#4	1.66	1.13	0.53
#8	0.34	1.69	-1.35
#16	1.67	2.37	-0.70
#30	1.91	2.29	-0.38
#50	1.06	1.35	-0.29
#100	0.17	0.77	-0.60
#200	-0.26	1.7	-1.96

MEAN

0.02

1. Determination	of Correction	Factors	<b>Using Analysis</b>	Method Two
	,			



### **Determination of Correction Factors** DATA USED FOR GRAPH OF DIFF. BETWEEN FIG. 6 AND 7 IRWIN/ WINDSOR / STUTE SIEVE SIZE 1/2 3/8 0.21 2.84 2.29 0.95 1.68 1.16 NNYYYYY 0.96 0.02 0.32 1.33 0.64 #4 0.60 1.12 1.1 #8 1.41 1.51 0.14 0.14 #16 0.60 1.27 1.65 0.43 #30 0.43 0.18 #50 1.1 0.92 #100 0.43 0.48 0.35 0.13 #200 0.14 0.02 0.12 0.43 MONK PIT SIEVE SIZE 1/2 3/8 0.95 YYNNYYNN 1.64 0.96 0.68 0.53 1.35 #4 #8 1.66 1.13 0.60 0.71 0.64 0.34 1.69 0.1 #16 1.67 2.37 0.70 0.60 1.91 2.29 0.38 0.43 #30

0.43

0.43

0.43

0.17

1.53

0.29

0.60

1,96

0.47

1.35

0.77

1.7

MEAN

1.06

0.17

-0.26

#50

#100

#200

**APPENDIX E** 

**CPL-5120** 

# Colorado Procedure L 5120

# Method of Test For

# Determination of the Asphalt Binder Content of Bituminous Mixtures By the Ignition Method

# 1. Scope

- 1.1 This method of test determines the asphalt binder content of bituminous mixtures by heating the mixture until the asphalt binder fraction of the mix ignites and is burned away. The gradation of the remaining aggregate may then be determined using CP 31. The applicability of this procedure to mixtures containing recycled asphalt pavement (RAP) has not been determined.
- 1.2 This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

# 2. Referenced Documents

# Colorado Procedures:

CP-30	Field Sampling Aggregates for use as				
	Highway Material				
CP-31	Sieve analysis, -200 Washed				
	Gradation				
CP-41	Sampling Fresh Bituminous Paving				
	Mixtures				
CP-55	Method for reducing samples of Hot				
	Bituminous Pavements to Test size				
CP-L 5105	Standard Practice for Preparation of				
	Test Specimens of Bituminous				

Mixtures by Means of Gyratory Shear Compactor

CP-L 5115 Standard Method for Preparing and Determining the Density of Bituminous Mixture Test Specimens by Means of the SHRP Gyratory Compactor

# 3. Summary of Test Methods

3.1 A specimen of bituminous mixture is heated in an oven having a temperature of 538° C (1000° F) until the asphalt binder fraction ignites and is burned away. The asphalt binder content is calculated by dividing the weight loss of the specimen during ignition by the mass of the bituminous mixture before ignition. A correction factor is determined for each bituminous mixture and then applied to the measured asphalt binder content of field produced bituminous mixture.

# 4. Apparatus

4.1.1 Forced-air ignition furnace, with internal balance, capable of maintaining a temperature of 500° C (930° F) to 650° C (1200° F), having an internal balance thermally isolated from the furnace chamber and accurate at room temperature to 0.1 gram. The balance shall be capable of weighing a 3,500 gram specimen contained in a basket assembly while it is heated. The National Center for Asphalt Technology Asphalt Content Tester (NCAT oven), is an oven containing a temperature compensated internal

scale which has been found to be suitable for determining asphalt binder contents. It is the only oven which currently has been evaluated for the purposes of this procedure.

- 4.1.2 Forced-air ignition furnace, without internal balance, capable of maintaining a temperature of 500° C (930° F) to 650° C (1200° F) may also be suitable. A testing procedure has not been developed or tested using this type of equipment. Potential users of this type of equipment will need to develop and use a test procedure which can be shown by statistical methods to provide adequate test result accuracy.
- 4.2 Two tempered stainless steel 2.36 mm (No. 8) mesh perforated basket assemblies, approximate dimensions (L x W x H) 26.7 x 26.7 x 5.1 cm with 5 cm support legs. The baskets shall be nested. The top basket shall be provided with No. 20 mesh screening on the legs to confine the aggregate.
- 4.3 Stainless steel catch/drip pan per basket assembly, approximate dimensions (L  $\times$  W  $\times$  H) of  $28.0 \times 28.0 \times 2.6$  cm.
- 4.4 Oven A forced draft oven capable of maintaining a temperature of  $121 \pm 5^{\circ}$ C.
- 4.5 External balance, at least 10 kg capacity, sensitive to 0.1 g.
- 4.6 Safety equipment: High temperature face shield, gloves, and a fire resistant long sleeve coat. In addition, a heat resistant surface capable of withstanding a temperature of 650° C and a protective cage capable of surrounding the basket assembly shall be provided.
- 4.7 Miscellaneous equipment. a pan having dimensions of approximately (L x W x H) 38 x 38 x 5 cm for transferring specimen after ignition, spatulas, bowls, and wire brushes.

# 5. Reducing Production Samples to Test Size

**NOTE 1**: The word *specimen* represents a test quantity of bituminous mixture. When the specimen's mass exceeds the capacity of test equipment, it may be divided into multiple units, tested, and the results recombined.

**NOTE 2**: The word *sample* represents a quantity of bituminous mixture gathered from a stockpile or roadway in accordance with CP-41.

- 5.1.1 If the bituminous mixture is not sufficiently soft to separate with a spatula or trowel, place it in a pan and warm it in a 121° C (250° F) oven until it can be so handled.
- 5.1.2 Sampling of HBP shall be done according to CP-30. Two separate, identical specimens shall be selected from each bituminous mixture production sample in accordance with CP-55. The two specimens shall not be combined at any time after they have been taken.
- 5.2 The specimens shall conform to the mass requirements shown in the appropriate column of Table 1 depending on whether or not an aggregate gradation is required.

# 6. Determination of Mix Correction Factors Using Laboratory Mixed Specimens

- 6.1 The results measured by this procedure may be affected by the types of aggregate and asphalt binder contained in the bituminous mixture. To ensure accuracy, a correction factor shall be established for each mix design.
- 6.2 At least three laboratory produced specimens conforming to the mass requirements of Table 1 (gradation not required) shall be prepared at the design asphalt binder content. Record the weights according to Section 6.2.1

**TABLE 1: Size of Specimen** 

Nominal Maximum Aggregate size, mm	Sieve size	Minimum mass of specimen (g). (If a gradation is required)	Minimum mass of specimen (g). (If a gradation is not required)
4.75	(no. 4)	1200	1100
9.5	3/8 in.	1200	1100
12.5	½ in.	1700	1100
19.0	3/4 in.	2200	1500
25.0	1 in.	3000	2200
37.5	1 ½ in.	5500	3300

Some specimen weights specified here may exceed the capacity of the temperature compensated internal oven scale. These specimens may be divided, the separate parts tested and the results recombined.

and follow the instructions for the Preparation of Laboratory Produced Specimens contained within CP-L 5105 or CP-L 5115.

- 6.2.1 Before mixing the specimens, record the weights of both the oven-dry aggregate and the asphalt binder contained in each specimen to the nearest 0.1 gram.
- 6.3 Follow Sections 7.1 through 7.14 to obtain an uncorrected asphalt binder content determination for each of the three specimens.
- 6.4 Determine the difference, or correction factor, between the actual asphalt binder content and the uncorrected asphalt binder content measured using both the temperature compensated internal oven scale and the external scale for each of the three specimens as specified in Sections 6.4.1 to 6.5.

- 6.4.1 Determine the actual asphalt binder content for each of the specimens (Section 9.1).
- 6.4.2 Following Section 7, determine the measured asphalt binder content for each of the specimens using both the external scale (Section 9.2.1) and the temperature compensated internal oven scale (Section 9.2.2).
- 6.4.3 Determine the correction factors for each of the specimens (Section 9.3).

NOTE 3: If the difference between the lowest and highest correction factor is greater than 0.30 percent, then mix and burn another specimen or specimens until the correction factors determined using three specimens of the same bituminous mixture are within 0.30 percent of each other.

6.5 Calculate the average correction factors for both the external scale and the temperature compensated internal oven scale.

## 7. Test Procedure

- 7.1 All production specimens shall be dried as specified in Section 7.1.1. Laboratory mixed specimens which have been exposed to moisture or have been stored at less than 100° C (212° F) for greater than 48 hours shall be dried according to Section 7.1.1. Laboratory mixed specimens which have not been exposed to moisture and which have not been stored at less than 100° C (212° F) for greater than 48 hours shall be heated according to Section 7.1.2.
- 7.1.1 Specimens as specified in Section 7.1 shall be dried in a 121° C (250° F) oven for 10  $\pm$  5 hours.
- 7.1.2 Initially dry specimens (as specified in Section 7.1) shall be heated by placing them into a 121° C ( $250^{\circ}$  F) oven for  $3 \pm 1$  hours.
- 7.2 Set the test temperature to 538° C (1000° F) by pressing the "TEMP" key on the NCAT oven, entering "538" and pressing the "ENTER" key. Allow a minimum of 2-1/2 hours for the NCAT oven to reach test temperature. Record the temperature set point prior to the initiation of the test.
- 7.2.1 Enter a correction factor of zero into the NCAT oven keyboard for all mixes by pressing the "CALIB" key, entering "0" and pressing the "ENTER" key. Press the "CALIB. FACTOR" key on the NCAT oven panel to verify that the correction factor is zero. The correction factor is labeled as the "calib. factor" on the NCAT oven tape printout.
- 7.3 Weigh the empty basket assembly,

consisting of the two baskets and drip pan with wire guards in place, on an external scale and record the weight.

- 7.4 Remove the top basket of the assembly and evenly distribute approximately ½ of the testing specimen in the bottom basket. Spread the bituminous mixture to a uniform depth in the tray, leaving a gap of approximately 10 mm between the specimen and the edge of the basket. Finer material should be kept near the center of the basket tray.
- 7.5 Place the top tray onto the bottom tray and load the remaining specimen into the top tray. Place the top cover over the basket and fasten the restraining wire into the slots on the drip tray of the basket assembly.
- 7.6 Weigh the loaded basket assembly on an external scale and record the weight. Determine the net weight of the mix contained in the basket assembly.
- 7.7 Press the "WEIGHT" button on the NCAT oven keyboard and enter the weight of the bituminous mixture being tested, rounded to the nearest whole gram, into the temperature compensated internal scale oven and then press the "ENTER" button.
- 7.8 Tare the temperature compensated scale oven digital readout by pressing a wire into the hole at the right hand end of the display panel.

# NOTE 4: Wear protective clothing (Section 4.6) whenever working near the NCAT oven while the oven door is open.

7.9 Open the chamber door. Lift the loaded basket assembly using the locking handle tool and place it into the NCAT oven. Close the oven door and allow 2 to 3 seconds for the oven scale to

stabilize. Compare the external scale reading of the loaded basket assembly weight to the NCAT oven scale reading. Verify that the NCAT oven scale's weight reading equals the weight determined in Section 7.6 within ± 5 grams. Differences greater than 5 grams or failure of the oven scale to stabilize may indicate that the basket assembly is contacting the interior walls of the oven.

7.10 Initiate the test within 10 seconds of closing the oven door by pressing the "START/STOP" button. This will lock the oven door. After approximately 20 seconds the temperature compensated internal oven scale will zero itself and the digital timer will start running.

NOTE 5: Do not attempt to open the oven door while Error 11 is flashing since the oven's contents may ignite violently. Turn off the oven and allow the contents to cool before opening the oven door.

- 7.11 Once the specimen weight is stable for a period of 2-3 consecutive minutes the light indicating a stable weight will illuminate without blinking and an audible beep will sound. Press the "START/STOP" button to stop the test and unlock the oven door. Use the locking handle to remove the basket assembly within 5 minutes of the illumination of the light signaling the end of the test.
- 7.12 Place the hot basket assembly on top of the ceramic cooling plate and place the safety cage over it.
- 7.13 Remove the printed tape from the temperature compensated internal oven scale and record the weight loss in percent, the temperature compensation, and the calculated asphalt binder content for the specimen. Record the specimen number and retain the printout as a record of the

test.

- 7.14 Allow a minimum of 35 minutes for the basket assembly to cool to room temperature or until it is warm to the touch. Weigh the basket assembly containing the residual aggregate on an external scale and record the weight.
- 7.15 Determine the uncorrected asphalt binder content for the external scale and the temperature compensated internal oven scale (Sections 9.2.1 and 9.2.2).
- 7.16 Determine the corrected asphalt binder content for the external scale and the temperature compensated internal oven scale (Section 9.4)

# 8. Gradation (Optional)

- 8.1 Empty the residual aggregate from the baskets into a flat pan. Use a small wire brush to ensure that any residual fines are removed from the baskets. Weigh the residual aggregate on an external scale and record the weight.
- 8.2 Perform a gradation analysis in accordance with CP 31.
- 8.3 CDOT has verified that the gradation results are the same with and without exposure to heat for aggregates from a wide variety of sources. However, there may be aggregates which degrade when exposed to the heat required to burn asphalt binder. If aggregate degradation is suspected, or if the test results will be used for project acceptance, Sections 8.3.1 to 8.3.6 may be used to verify whether aggregates have a tendency to degrade.
- 8.3.1 Obtain a sample of the final aggregate blend in question from a conveyor belt discharge or a stopped conveyor belt according to CP 30.

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Methal Subject to Revision.

- 8.3.2 Using a sample splitter, split a sample weighing at least 8 times the sample size specified in Table 1 (gradation required) into 8 specimens having approximately equal mass. Set 4 specimens aside.
- 8.3.3 Mix 4 of the aggregate specimens with asphalt cement to yield specimens having an asphalt binder content within 0.5 percent of the mix in question.
- 8.3.4 Test the 4 mixed specimens as specified in Section 7.
- 8.3.5 Using CP-31, determine the gradation of the 4 specimens which were mixed with asphalt binder and burned. Determine the gradation of the 4 specimens which were set aside in Section 8.3.2.
- 8.3.6 Calculate the average percent passing each sieve size for the 2 sets of 4 specimens. Compare the average gradation at each sieve size for the two sets of specimens. If the gradation of the aggregate exposed to the heat applied in Section 8.3.4 is more than 3 percent finer than the untreated aggregate on any of the sieves, the aggregate may be sensitive to heat degradation. If the average gradation is within 3 percent on all screens, the aggregate is not sensitive to heat degradation.
- 8.3.7 If an aggregate has been found to be sensitive to heat degradation in Section 8.3.6, apply a correction factor to the percent passing each screen to account for the degradation caused by the NCAT oven.

# 9. Calculations

9.1 The actual asphalt binder content of a laboratory mixed specimen is determined as follows:

$$P_{b(actual)} = \frac{W_b}{W_s + W_b} \times 100$$

where,

P<sub>b(actual)</sub> = percent of asphalt binder in specimen

W<sub>s</sub> = weight of aggregate in specimen
 W<sub>b</sub> = weight of asphalt binder in specimen

9.2.1 The uncorrected asphalt binder content of a specimen is determined using an external scale as follows:

$$P_{b(uncorr)} = \frac{(W_{m(initial)} + W_{besinst}) - (W_{m(final)} + W_{besinst})}{(W_{m(initial)} + W_{besinst})} \times 100$$

where,

P<sub>b(uncorr)</sub> = uncorrected asphalt binder content, in percent, determined by the mass loss measured on an external scale.

W<sub>m(initial)</sub> = Weight of the bituminous mixture specimen before using the temperature compensated internal oven scale measured at 121° C (250° F).

W<sub>m(final)</sub> = Weight of the bituminous mixture specimen after using the temperature compensated internal oven scale measured at room temperature.

W<sub>basket</sub> = Weight of the empty basket assembly at room temperature.

9.2.2 The uncorrected asphalt binder content of a specimen is automatically calculated by the temperature compensated internal oven's scale

software using the bituminous mixture weight input in Section 7.7. At the end of each test, the uncorrected asphalt binder content is printed on a paper tape.

9.3 The mix correction factor is determined for asphalt binder contents determined using each method of measurement (both the external scale and the temperature compensated internal oven scale) as follows:

$$C_f = P_{b(actual)} - P_{b(measured)}$$

where,

C<sub>f</sub> = asphalt binder correction factor determined for a specific method of measurement e.g. using the external or the temperature compensated internal oven scales.

P<sub>b(measured)</sub> = uncorrected asphalt binder content of a specimen as determined in Sections 9.2.1 or 9.2.2.

9.4 The corrected asphalt binder content for field produced specimens using both the external scale and the temperature compensated internal oven scale is determined as follows:

$$P_{b(corr)} = P_{b(uncorr)} + C_f$$

where.

P<sub>b(corr)</sub> = asphalt binder content of field produced specimens corrected for the aggregate and asphalt binder sources.

# 10. Report

10.1 Report the corrected asphalt binder contents determined using the external scale. Results from the temperature compensated internal oven scale should be reported for information only.

# CDOT Research Report Publication List

- 91-1 Industrial Snow Fence vs. Wooden Fences
- 91-2 Rut Resistant Composite Pavement Design (Final Report)
- 91-3 Reflective Sheeting (Final Report)
- 91-4 Review of Field Tests and Development of Dynamic Analysis Program of CDOH Flexpost Fence
- 91-5 Geotextile Walls for Rockfall Control (canceled)
- 91-6 Fly Ash in Structural Concrete
- 91-7 Polyethylene Pipes for Use as Highway Culverts
- 91-8 Ice Detection System Evaluation
- 91-9 Evaluation of Swareflex Wildlife Warning Reflectors
- 91-10 analysis and Design of Geotextile Reinforced Earth Walls, Vol III Parametric Study and Preliminary Design Method
- 92-1 Colorado Department of Transportation Asphalt Pavement White Paper
- 92-2 Expansive Soil Treatment Methods in Colorado
- 92-3 Gilsonite An Asphalt Modifier
- 92-4 Avalanche Characteristics and Structure Response East Riverside Avalanche Shed, Highway 550, Ouray County Colorado
- 92-5 Special Polymer Modified Asphalt Cement Interim report
- 92-6 A User Experience with Hydrain
- 92-7 Chloride Content Program for the Evaluation of Reinforced Concrete Bridge Decks
- 92-8 Evaluation of Unbonded Concrete Overlay
- 92-9 Fiber Pave, Polypropylene Fiber
- 92-10 Description of the Demonstration of European Testing Equipment for Hot Mix Asphalt Pavement
- 92-11 Comparison of Results Obtained From the French Rutting Tester With Pavements of Known Field Performance
- 92-12 Investigation of the Rutting Performance of Pavements in Colorado
- 92-13 Factors That Affect the Voids in the Mineral Aggregate In Hot Mix Asphalt
- 92-14 Comparison of Colorado Components Hot Mix Asphalt Materials With Some European Specifications
- 92-15 Investigation of Premature Distress in Asphalt Overlays on I 70 in Colorado
- 93-1 Dense Graded Concrete
- 93-2 Research 92- Reality and Vision, Today and Tomorrow (Status Report)
- 93-3 Investigation of the Modified Lottman Test to Predict the Stripping Performance of Pavements in Colorado
- 93-4 Lottman Repeatability\
- 93-5 Expert System for Retaining Wall System Phase I
- 93-6 Crack Reduction Pavement Reinforcement Glasgrid
- 93-7 A Case Study of Elastic Concrete Deck Behavior in a Four Panel Pre-stressed Girder Bridge Finite Element Analysis
- 93-8 Rehabilitation of Rutted Asphalt Pavements (Project IR-25-3(96)
- 93-9 Cold Hand Patching

- 93-10 Ice Detection and Highway Weather Information Systems
- 93-11 Comparison of 1992 Colorado Hot Mix Asphalt With Some European Specification
- 93-12 Curtain Drain
- 93-14 Type T Manhole(Experimental Feature)
- 93-15 SHRP Seasonal Monitoring Program in Delta
- 93-16 DOT Research Management Questionnaire Response Summary
- 93-17 In Service Evaluation of Highway Safety Devices
- 93-18 Courtesy Patrol Pilot Program
- 93-19 I 70 Silverthorne to Copper Mountain: A History of Use of European Testing Equipment
- 93-20 Analytical Simulation of Rockfall Prevention Fence Structures
- 93-21 Investigating Performance of Geosynthetic-reinforced Soil Walls
- 93-22 Influence of Testing Variables on the Results from the Hamburg Wheel-Tracking Device
- 93-23 Determining Optimum Asphalt Content with the Texas Gyratory Compactor
- 94-1 Comparison of the Hamburg Wheel-Tracking Device and the Environmental Conditioning System to Pavements of Known Stripping Performance
- 1-94 Design and Construction of Simple, Easy, and Low Cost Retaining Walls
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- 94-3 Comparison of Test Results from Laboratory and Field Compacted Samples
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- 94-7 Influence of Refining Processes and Crude Oil Sources Used in Colorado on Results from the Hamburg Wheel-Tracking Device
- 94-8 A Case Study of Concrete Deck Behavior in a Four-Span Prestressed Girder Bridge: Correlation of Field Test Numerical Results
- 94-9 Influence of Compaction Temperature and Anti-Stripping Treatment on the Results from the Hamburg Wheel-Tracking Device
- 94-10 Denver Metropolitan Area Asphalt Pavement Mix Design Recommendation
- 94-11 Short-Term Aging of Hot Mix Asphalt
- 94-12 Dynamic Measurements of Penetrometers for Determination of Foundation Design
- 94-13 High-Capacity Flexpost Rockfall Fences
- 94-14 Preliminary Procedure to Predict Bridge Scour in Bedrock (Interim Report)
- 95-1 SMA (Stone Matrix Asphalt) Flexible Pavement
- 95-2 PCCP Texturing Methods
- 95-3 Keyway Curb (Construction Report)
- 95-4 EPS, Flow Fill and Structure Fill for Bridge Abutment Backfill
- 95-5 Environmentally Sensitive Sanding and Deicing practices
- 95-6 Reference Energy Mean Emission Levels for Noise Prediction in Colorado
- 95-7 Investigation of the Low Temperature Thermal Cracking in Hot Mix Asphalt
- 95-8 Factors Which Affect the Inter-Laboratory Repeatability of the Bulk specific Gravity of Samples Compacted Using the Texas Gyratory Compactor

- 95-9 Resilient Modulus of Granular Soils with Fine Contents
- 95-10 High Performance Asphalt Concrete for Intersections
- 95-11 Dynamic Traffic Modeling of the I 25 HOV Corridor
- 95-12 Using Ground Tire Rubber in Hot Mix Asphalt Pavements
- 95-13 Research Status Report
- 95-14 A Documentation of Hot Mix Asphalt Overlays on I 25 in 1994
- 95-15 EPS, Flowfill, and Structure Fill for Bridge Abutment Backfill
- 95-16 Concrete Deck Behavior in a Four-Span Prestressed Girder Bridge (Final Report)
- 95-17 Avalanche Hazard Index for Colorado Highways
- 95-18 Widened Slab Study
- 96-1 Long-Term Performance Tests of Soil-Geosynthetic Composites
- 96-2 Efficiency of Sediment Basins: Analysis of the Sediment Basins Constructed as a Part of the Straight Creek Erosion Control Project
- 96-3 The Role of Facing Connection Strength in; Mechanically Stabilized Backfill Walls
- 96-4 Re-vegetation of MSB Walls
- 96-5 Roadside Vegetation Management
- 96-6 Evaluation of Slope Stabilization Methods (US 40 Berthoud Pass) (Construction Report)
- 96-7 SMA (Stone Matrix Asphalt) Colfax Avenue Viaduct
- 96-8 Determining Asphalt cement Content Using the NCAT Asphalt Content Oven
- 96-9 HBP QC & QA Projects Constructed in 1995 Under QPM1 and QPM2 Specifications
- 96-10 Long-Term Performance of Accelerated Rigid Pavements, Project CXMP 13-006-07
- 96-11 Determining the Degree of Aggregate Degradation After Using the NCAT Asphalt Content Oven
- 96-12 Evaluation of Rumble Treatments on Asphalt Shoulders
- 97-1 Avalanche Forecasting Methods, Highway 550
- 97-2 Ground Access Assessment of North American Airport Locations
- 97-3 Special Polymer Modified Asphalt Cement (Final Report)
- 97-4 Avalanche Detection Using Atmospherical Infrasound
- 97-5 Keyway Curb (Final Report)

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